THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XIX. No. 464—22ND YEAR.] LONDON, JULY 19, 1870. [Subscription { 15s. in Advance. / 18s. Credit. } per Annum.] DOUBLE No. Price 1s.

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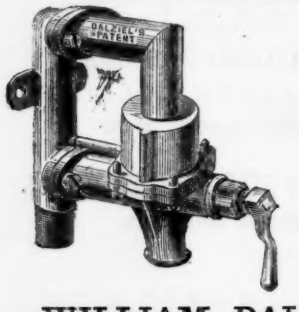

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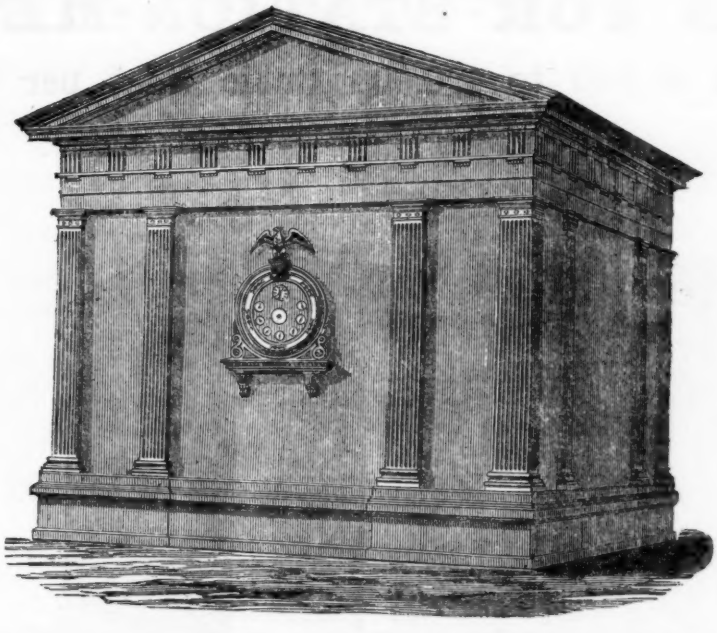

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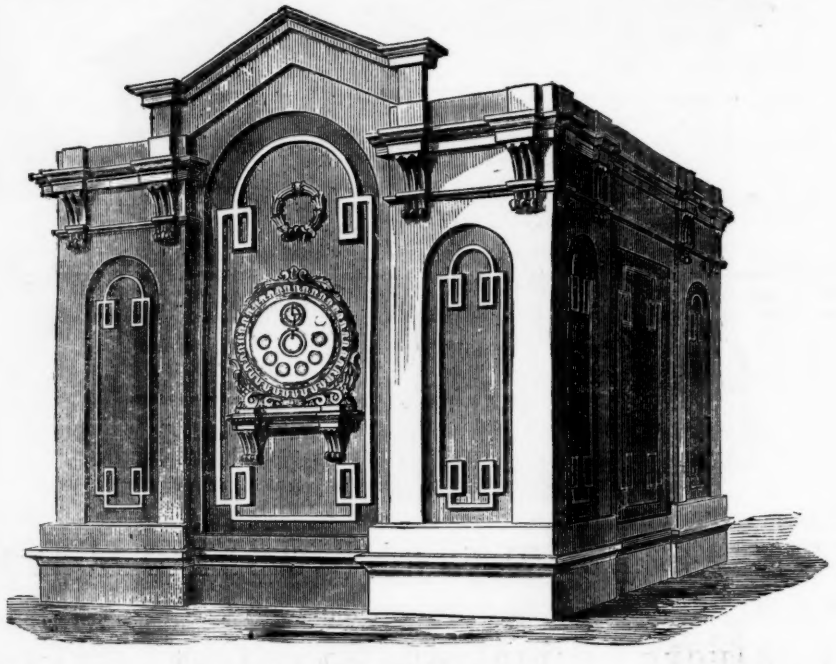

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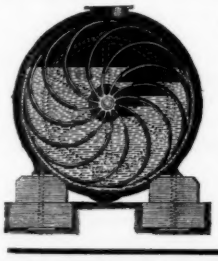

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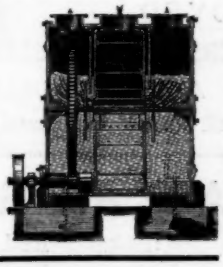

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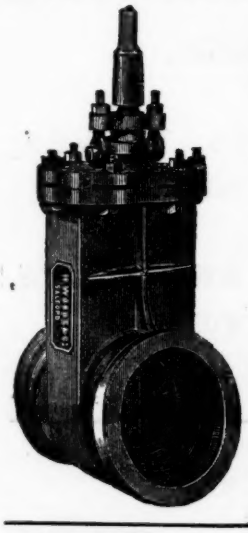

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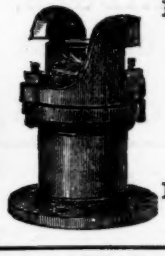

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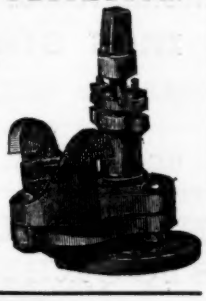

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And BIRMINGHAM (TANGYE BROTHERS), CORNWALL WORKS, SOHO.

SOLE MAKERS OF

MORTON'S PATENT SELF-SEALING RETORT-LIDS.

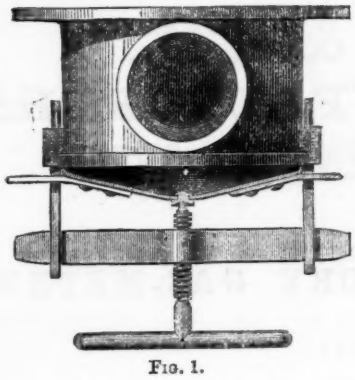

FIG. 1.

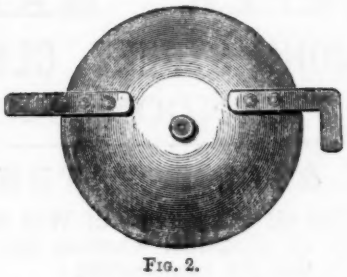

FIG. 2.

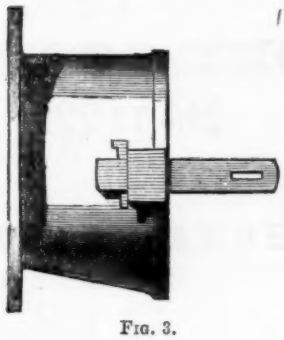

FIG. 3.

Several Hundreds in successful operation in various Gas-Works.

The expensive and cumbersome process of sealing the mouths of Gas-Retorts by means of luting the Lids with lime and other materials hitherto used for that purpose, is henceforth rendered unnecessary, and will be superseded by the very efficient method shown in the accompanying illustrations.

Fig. 1 shows a plan of a mouthpiece with Morton's Patent Lid in section. The mouthpiece is faced true, and the projecting circular edge or periphery of the lid is also turned true, and, by preference, of a semicircular section, so that the point of contact is reduced to a minimum; the convex form of the Lid rigidly sustains the force of the screw, which, by its central action, gives the Lid a uniform bearing, and effectually seals the mouth of the Retort.

Fig. 2 shows a front view of Morton's Patent Lid, which is stamped out of plate iron, having (in this case) ledges to rest on the lugs of the mouthpiece; these Lids, however, are more generally fitted to hinged cross-bars, by which means they remain suspended while the charge is withdrawn and the Retort charged, so that the damage done by throwing them about is entirely prevented.

The advantages obtained are—

1st. The sound sealing of the Retort during the whole time it is carbonizing the charge of coal, there being no jointing medium between the Lid and the mouthpiece.
2nd. The improved condition of the coke by the non-mixture of lime.
3rd. The Lid requires no preparation on the part of the stoker, beyond slightly scraping the surface to remove extraneous grit or dirt.
4th. The Lids are only about two-thirds the weight of the old form in general use, a Lid for a 16-inch mouthpiece weighing a little over 20 lbs.
5th. The Self-sealing Lid reduces labour, saves wear and tear, obviates all the inconvenience and discomfort consequent on the preparation of luting, and effects a great reduction in the working expenses. The cost attending the process of "luting" in several large gas-works, exceeds £1000 per annum, ranging in various works from 20s. to 35s. per mouthpiece.

It will be obvious that a round Lid is the most convenient and the cheapest form. D Retorts are adapted for round Lids, by carrying the bottoms down the necessary depth for that purpose, as shown in Fig 3. Some mouthpieces have been thus adapted, and are in use at the Chartered Gas-Works.

The following testimony speaks in favourable terms after ample and careful test:—

Burslem and Tunstall Gas Company, Longport, Staffordshire, Oct. 12, 1869.

Dear Sir,—In reply to your favour of the 9th inst., I have pleasure in stating that my admiration for your Patent Retort-Lid is most unqualified. I have 14 of them in use, and have tested them in the severest manner possible at these works, but without being able to detect the slightest defect. Yesterday the strap slipped off the exhauster, and a pressure of 13 inches was thus almost instantly thrown upon the Retorts, but although many of the luted Lids were leaking, not the slightest escape was observable from yours. I had anticipated that at least some greater degree of care would have been required in the scraping of the mouthpieces after the drawing of each charge, but even in this particular I find that labour has been reduced.

By every stoker on these works, as well as by myself, your Lids are regarded as a boon.

Please send me 30 more at your earliest convenience.

I am, &c., (Signed) HENRY WOODALL.

R. Morton, Esq.

Chartered Gas Company, Horseferry Road, Westminster, Sept. 15, 1869.

Dear Sir,—I have only lately returned to town, which is the reason I have not replied earlier to your inquiry.

I beg to say that I have had your Lids in use for upwards of two months, and during that time they have always kept a perfectly sound joint. I may add that where your lids are used only one set is required.

I remain, &c., (Signed) G. O. TREWBY.

R. Morton, Esq.

Chartered Gas Company, 146, *Goswell Street, E.C., Oct.* 20, 1869.

Dear Sir,—I have much pleasure in stating that, after some months trial of your Retort-Lids, I find them everything I could desire. I consider the plan a great improvement.

I am, dear sir, yours truly, (Signed) A. UPWARD.

R. Morton, Esq., London Gas Company.

These Lids are in successful use at the London Gas-Works, the Chartered Gas-Works, the Dublin Gas-Works, the Burslem and other Works, giving great satisfaction.

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London, 1851. New York, 1853. Paris, 1855. London, 1862.

Dublin, 1865. Paris, 1867.

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PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

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DRY GAS-METER MANUFACTURERS,

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2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

MANUFACTURERS OF

PATENT WET & DRY METERS,

STATION-METERS AND GOVERNORS,

PRESSURE REGISTERS, GAUGES,

EXPERIMENTAL METERS, PHOTOMETERS, GASHOLDERS, &c., &c.

WATER METERS.

W. P. & Co. beg to state that they are now prepared to supply Station-Meters with planed joints.

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TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

NOTICES.

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THE JOURNAL OF GAS LIGHTING, WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JULY 19, 1870.

Notes upon Passing Events.

MR. AYRTON'S official bad fortune continues to pursue him. His duties smother him in the Kensington Road Improvement, and seem likely to drown him 14 feet deep in the Serpentine. No one but a comic cartoonist could do justice to his peculiar position. For power, patronage, and whatever other sweets of office may remain in these reforming days, he has exchanged the freedom of a "noble savage," or, rather, the happy independence of a traditional Irishman in a row—ready with his "*alpeen*"-like tongue to knock down any prominent head on either side of the House. *Now* he might stand out on the pages of *Punch*, or of the *Tomahawk* in Matt Morgan's days, before it was hired out to music-hall proprietors and Indian princes—a crouching figure at which King Lear, pointing his finger, cried—

> Take physic, pomp, and teach
> Thyself to feel what wretches feel

on the Treasury benches, with an Ayrton in opposition; or an example of the Roman poet's "Good man struggling with the "storms of fate;" or the hero of Tennyson learning "How "divine a thing it is to suffer and be strong;" or the rival of General Tom Thumb, folding his arms, as "Ajax defying the "thunder" of parochial indignation. A very short paper printed for the House of Commons shows that, in the matter of the Kensington Road, he found the plan, supported by the highest authorities, cut and dried for him in his office. Plans A and B not only show a manifest improvement in Kensington Road, but that the cry of "Woodman, spare that tree" is mere claptrap. Seven trees only are to go, of which two would in any event be condemned. For this we have the authority of Dr. Hooker, of the Kew Gardens; Mr. Manns, Superintendent of the Forest Department of the Parks, is not sufficiently satisfactory in his work to inspire confidence. Better still, we have Mr. Gilbert Scott writing that, "in 1862, a committee of architects, including "Messrs. Tite, Smirke, Scott, Pennethorne, Hardwick, and Digby "Wyatt, called on to advise on the Albert Memorial, recom-"mended the site adopted," subject to a plan for straightening the main road. In 1863 a plan of the alteration was drawn and added to a report signed by Lords Derby and Clarendon, Sir W. Cubitt, and Sir C. Eastlake, all since dead. The real cause of the disfavour with which the scheme has been received on both sides of the House is not in consequence of the slice lopped from the park, but of the slice presented to the Horticultural Society's gasometer-like Hall of Omniscience. While the public were paying no attention, in 1863, to the plans for laying out the ground round the Albert Memorial, the South Kensington authorities, by whom the hall schemes were contrived and managed, acted on it—saved space in the rear by thrusting their huge building forward on the road. H. B. Cole, C.B., and Co., so frequently get their own way by continually "pegging away," like President Lincoln, that the House of Commons are glad when they have an opportunity of crying "check" to your king or queen, as the case may be, although checkmate may be altogether out of the question. We prophesy that, if not this session, in the next, the Kensington Road will at least be made straight.

The Serpentine case, as regards Mr. Ayrton, would be still harder, and more unjust, if he only had the sense and the manners to listen patiently to a powerful deputation, instead of bristling up like an official Bumble, at the idea of an independent engineer daring to criticize the plans of the official engineer, and hitting out right and left at Lord Harrowby, the essence of Conservative respectability, with a direct negative. The fact is that every President of the Board of Works lives in an embarrassing position. On the one hand, powerful metropolitan interests are continually pressing him to spend money in beautifying the parks and gardens of the metropolis; on the other hand, politicians of all shades, not tied to the Government car, and not interested in parks and gardens, are strenuous in their cries of "Economy, economy!" We do not know who is the official engineer answerable for the Serpentine improvements, whether it is Mr. Fowler or Mr. Amos—both, we believe, have had a finger in the mud pie—or Captain Galton. It is probably true that all money voted for the purpose is spent or due on existing contracts, and that Mr. Ayrton only follows official precedents in resting on the advice of his official engineer. But it is also quite certain, as any man less arrogant and obstinate would have seen, that in the Serpentine question the department and the Government must give way. The Chancellor of the Exchequer must ask if the House of Commons will vote the money required for making this half-finished job complete. All the organs of public opinion are agreed on the matter. The *Times*, the *Daily News*, the *Morning Advertiser*, and the *Standard*, the *Pall Mall*, and the *Echo*, all protest against the insolence of the minister and the incompleteness of the plan. Half a million of men and boys bathe in the Serpentine in hot summers, in cold summers over three hundred thousand. For the benefit of a population exceeding that of most cities, three things are demanded—First, that all the buttery fœtid mud shall be cleared away, instead of covering it over with a layer of gravel, which would have the fate of clean straw laid down to hide dirty litter; secondly, that the depth of a large portion of the pool should be reduced so as to make bathing safe to those who cannot swim—this reduction might be confined to one half of the Sepentine; thirdly, that in some way a gentle flow of water be secured. In Regent's Park the ill-considered reduction of the depth of the water has turned it into a stinking pond. Perhaps if the acidity of Mr. Ayrton's temper could be infused in the Serpentine, that alone would have a disinfecting effect. We do not doubt but that Parliament may be persuaded to find another £20,000 for further excavations and removal of mud. Dry stuff to any extent may be cheaply obtained by simply allowing the builders, now driven to their wits end and five miles out of town, to deposit lime rubbish in the bed of the Serpentine. But if the Serpentine is to be thoroughly utilized as a bathing-place, we want some better advisers than the old women of the Humane Society—a society as much behind the age as any of the London liveries. The proper plan would be to buoy out, and mark with ropes floated on cork, like nets, the little boys limits of safety for those who cannot swim. Swimmers should be looked after not in a clumsy boat, but in an unsinkable canoe, the canoe-man to be provided with long

poles, with lines and corks at the ends—simple instruments, by which more lives of struggling swimmers have been saved than by elaborate contrivances. The buoys might also be made places of safety. The adaptation of the Serpentine to safe bathing is the more needful because mock modesty has set the police to chase boys of tender age and ragged clothes from every canal in the metropolis—from places, too, where women could only see the little naked figures by taking a great deal of pains to look over the high walls of bridges. In summer weather facilities for bathing are only less important to the little-washing public than supplies of wholesome drinking water.

Another parliamentary paper shows, on a coloured plan, the appropriation of the land reclaimed from the Thames by the Metropolitan Board. This document does not read pleasantly to a ratepayer, and did not produce a soothing effect on the House of Commons. The coloured plan aggravates the dissatisfaction. The cost of the embankment was £1,600,000. A large slice, coloured blue, over two acres of the foreshore, is reserved for the Crown in reversion, for a present for Crown lessees, like the Duke of Buccleuch and Sir Robert Peel, who have also received large money compensation for the improvement of their property by turning mud into dry land. Two acres and a third opposite Whitehall Place are claimed to be at the absolute disposal of the Crown; two acres and a quarter go to increase Temple Gardens, but as these gardens are practically open to the public, the concession is not to be regretted. After deducting the space occupied by the roadway, there remain five and a half acres—the greater space of which lies between Hungerford and Waterloo Bridges—to be laid in pleasure-grounds, the Metropolitan Board's viaduct and architectural schemes having most fortunately been defeated. The personal comforts of the Crown ought to be supplied in a manner worthy of a rich and generous nation, but it is rather hard that Crown rights should always be presented to taxpayers in the shape of compensation for improving the muddy banks of the Thames, and in such dog-in-the-manger policy as that which blocks up Hamilton Place and Park Lane. So thought the House of Commons when, by a majority of fifty, it defeated the most powerful Cabinet of post-Reform Bill times, and carried an address to the Crown against covering the Whitehall mud-bank reclamation with Government offices. Mr. Walpole hit on the head a nail that will come in very usefully again and again to clench arguments against the absurd and unjust way in which the Woods and Forests representatives of the Crown exercise their duties and their privileges. The fiction that to surrender to the public the use of the mud flat would be to surrender property worth £150,000, had been worked most ingeniously by Mr. Lowe and Mr. Gladstone. Mr. Walpole argued that surely the dwellers in London ought not to be worse treated than Irishmen under the ministerial Land Bill. If an Irishman reclaims a bog, and turns it into an oats and potatoe crop-producing farm, without any previous contract, his claim to compensation, most justly, makes a large hole in the value of the improved freehold. Are metropolitans to be treated worse than Irishmen? The question ought not to rest on the banks of the Thames. It has a larger issue. The whole system of the administration of Crown lands, forests, mines, and foreshores demands a searching examination. The greed displayed on the banks of the Thames is only equalled by the negligence of profitable returns in the New Forest.

Breeze is not worth what it was to brickmakers. Coal dust, from the vast importation by sea and by rail, can be bought cheap, and is much more effective than the dust and dirt collected by parish contractors. The City of London, once the greatest dust-cart filler, has, by its new mode of collection, entirely altered the character of the material. Road sweepings, ground all day by wheels, and collected at long intervals, left no trace of the quantities of horse dung which are now gathered in the shape of pure manure—an article not easy to dispose of at a profit in large quantities, and which will not bear storing without creating a nuisance, like the old road sweepings. The City seems inclined to alter its policy on the scavenging question. Formerly it was the boast of reports on street-cleaning that the work had been done so many thousands cheaper than some previous year. Now the idea, and almost the boast, is that the City is cleaner than ever it was under the old contract system. The City of London scavenging is creditable so far, but a long way from perfection; and to attain perfection, as great as the climate and the traffic will allow, must be the aim. A great deal turns on street-cleaning. A vigorous effort is being made to introduce Val de Travers asphalte instead of wood paving. The advocates of this material claim that it will not cost more, will not be more difficult to repair, and will last longer without repair than granite cubes. These are points that can only be settled by the close observation of the engineer. We should not think of giving an off-hand opinion on a question affected by so many controlling circumstances, and in which so many pecuniary interests are concerned, but we may point out that if asphalte could with reasonable economy be introduced into the thoroughfares of the metropolis instead of cubes, and instead of macadam, and if it were accompanied, as it must be, by a very perfect system of cleaning the streets, a diminution of dust and a diminution of noise would take place equal to a large rate on all streets where retail trades are carried on. There would also be a diminution of damp, while water sluicing might be freely applied. But asphalted streets not clean would be so slippery as to be extremely dangerous to horse traffic. We wait with a good deal of interest for the report of the City Engineer on this subject, because he is in a better position than any one else in Europe to collect road traffic facts; besides, if the City system of pavement and road cleansing succeeds, it must be imitated by the whole metropolis.

Sir William Tite has made the refreshing announcement that the Chelsea Embankment—nearly a mile long, from the front of Chelsea Hospital to Battersea Bridge—is to be proceeded with immediately, and completed within two years; by which time, also, no doubt, gardens and pleasure-grounds will occupy the site over which ambitious Mr. Bazalgette once planned a hideous and monumental viaduct.

The Watermen's Company, whose monopoly was emphatically condemned, sixteen years ago, by Sir G. Cornewall Lewis and his fellow-commissioners, and who have been twice condemned in the House of Commons, have had influence enough in the Lords to strike out the abolishing clauses of the Bill promoted by the Thames Conservancy Board. This mischievous and useless monopoly will therefore endure until Parliament takes the whole question of the Corporation of London in hand. The Conservators Bill ensured a much better test of "skill and dexterity" than any at present imposed on the large army of loafers called Thames watermen. We can scarcely imagine that the powers which enable these monopolists to force themselves on board barges tugged by steam, and on steamboats, can be maintained.

The Holborn Valley improvement has been completed, as far as it was originally designed, by the opening of Snow Hill—a new street with an old name, leading from the east end of the Viaduct to Farringdon Street by an easy slope, so calculated that vans may trot up it—no mean advantage to traffic. Fortunately and naturally the appetite for street improvements "grows by what it "feeds on," and the committee have induced the Corporation to sanction other extensions at great cost, but of adequate value to the ever-increasing traffic of the metropolis. The Holborn Circus—a very striking improvement from very simple means; a street from the Circus to Shoe Lane, beneath the Viaduct; and a street from Stonecutter Street into Fleet Street, are all additions to the original plan. Of course, the way has been stopped by exorbitant claims for compensation. Citizens are now getting the pull which was the privilege and profit of country gentlemen in early railway days. It is no exaggeration to say that country gentlemen recovered the loss they sustained in mortgages, by the return to cash payments, and found means for the extraordinary permanent agricultural improvements that have characterized the last quarter of this century, in the exorbitant payments they extorted from railway companies. Terrible is the gnashing of teeth and wailing now that financial reasons have rendered the extension of the District Railway from Cannon Street to Tower Hill impossible.

The report of the Commissioner of Police, Colonel Henderson, contains a good deal of interesting matter on other subjects than police. Extracts from the facts of the report that refer to the efficiency of the "force" have been freely circulated in the daily papers, but there are sections of value that have not been touched. A great deal has been written on the necessity of increasing the number of detective policemen; but this is easier said than done. A detective is "born, not made," and can no more be improvised than a poet or a cook. Up to 1869 the detective force only consisted of fifteen persons—very clever men, many of them, but quite insufficient in number for the floating criminal business. At present one superintendent, three chief inspectors, three inspectors, 40 sergeants, and 160 police constables, form a special detective force, and to this force the men with a natural talent and taste for crime-hunting will gradually, yet surely, be attached. The following paragraph is very English: —"The police in all weathers, under circumstances which are often very trying, are expected to be prompt, ready of resource, and perfectly civil." How a French or Prussian policeman would stare at such an injunction! The police are theoretically expected to suppress the trades of prostitutes, vagrants, and beggars, but as annoyance must be proved by a witness, and as few persons like to attend at a police court for such a purpose, the Acts are very weak; the hands of the police must be strengthened if anything really effectual is to be done. Since the employment of the metropolitan police to guard the dockyards, the marine store dealers who purchased stolen metal have nearly all migrated from the neighbourhood of the dockyards. The Contagious Diseases Acts apply to Portsmouth, Plymouth, Devonport, Sheerness, Chatham, Woolwich, Aldershot, Windsor, Shorncliffe, Colchester, Green-

wich, Winchester, Dover, Canterbury, Deal, Maidstone, Gravesend, Dartmouth, Ivy Bridge, and Southampton, and are carried out by selections from the metropolitan police. An attempt to prove even one case of abuse of powers, in any one of these towns, broke down before an arbitrator selected by the Anti-Contagious Diseases Committee. The police object very strongly to being called on to act as assistant-relieving officers. The appendix to the report shows that much more stringent laws are required for punishing and putting down professional tramps and beggars. The police have rendered essential services by carrying out the Acts for regulating the common lodging-houses, where any one is taken for the night at a charge of from twopence to sixpence. These houses must now be registered; if not registered, the police proceed against and suppress them. A registered house must be well ventilated, have clean beds and bedding, limewashed sleeping-rooms, well-cleaned kitchens, plenty of water for all purposes, good water-closets, sinks drained and trapped; the sexes separated in sleeping-rooms; married couples provided with partitions of solid materials. These Acts should be extended to licensed victuallers in whose houses great abuses prevail. Betting-houses have been put down, but the law as to betting-clubs is in an undecided state—Tattersall's subscription-rooms being the protecting bulwark of these gambling institutions, for to Tattersall's belong a large section of the Lords and Commons of Parliament.

Police constables are gradually superseding the old hackney carriage attendants. The improvement should be completed by roofing over every hackney carriage stand, charging a rent for use of same, adding an office for the attendant, and a urinal for the public.

The special report made to the commissioner on "casual "poor" gives sixteen cases, with names and particulars, out of which only one was that of a man willing to work, or with the least intention of working. The following is an excellent example of the average casuals for whose benefit expensive establishments are kept up all over the country. The system must be made absolutely penal. "John Conner, age 21 years; William "Hind, age 23 years; and William Morris, age 24 years, were "born in London, and when they were young had worked in a "lucifer match factory." Work did not suit their complexion; they never knew any one get fat on work. These were three incorrigible vagabonds who had been casual paupers all their lives, and desired nothing better. Others were less candid, but equally incorrigible. For this class of vagabonds special legislation and police regulations are required. The same remark applies to professional beggars. Amongst beggars, however, of the crippled class, two or three respectable, orderly persons are to be found.

Circular to Gas Companies.

Notice has been given to proceed with the Gas and Water Facilities Bill; and, in addition to the amendments we have previously noticed, Lord Kimberley proposes to add a clause making it "lawful "for Her Majesty, at any time after the passing of the Act, by "an Order in Council, to substitute for the Board of Trade any "other department of Government, and from and after such time "as may be specified for the purpose in any such order, or, if no "time be specified therein, from and after the date of such order, "all matters to be done in pursuance of the Act, by or in con-"nexion with the Board of Trade, shall be done by or in con-"nexion with such substituted department." The law lords have as yet given no sign of disapproval, and the Bill will probably pass with the proposed amendments.

The Tramways Bill has come from the select committee of the House of Lords considerably extended, and somewhat amended, so far as the provisions relating to gas and water companies are concerned. The original provisions will be found in our number for March 15, p. 196. In the section as amended no interference with private service-pipes for the supply of gas or water is allowed without consent, and the anomaly we pointed out, that compensation was to be given for interruptions of water supply, but not of gas, is corrected, by extending the provision to gas as well as water. So far it is well, but it is impossible to say how the Act will operate in actual practice. There are some situations in the metropolis in which it will be hardly possible to avoid grave inconveniences. We may take the East India Road, Poplar, as an illustration. A tramway along this road is certain to be projected. But the Chartered Company are now laying a 4-feet main along the road, with special contrivances for crossing certain bridges, which will occupy nearly half the roadway. It will be impossible to alter the position of these, and, to gain access to them, it will be at all times necessary to interrupt the tramway. Whether the inconveniences which must result from an extensive application of this Bill will be greatest to gas and water companies or tramway proprietors we will not pretend to say, but the provisions relating to the former deserve the serious consideration of all companies in large towns, and, if it should be deemed that they are calculated to deprive the owners of gas and water pipes of due access to them, the Bill should be resolutely opposed.

The Sheerness Local Board seem fixed in their determination to have gas-works of their own, and have commenced by a proceeding which is as illegal as it is improvident. They have offered a premium of twenty guineas for plans, specifications, and estimates for works, and the successful competitor is to supply working drawings, which are to become the property of the Board on payment of the above premium. The offer is not likely to attract the attention of any engineer of eminence, and, moreover, what the Board actually wants could easily have been obtained for nothing. The expenditure of £21 out of the rates, for the purpose proposed, is, beyond all doubt, illegal; and, when the accounts of the Board are audited, it will be open to any ratepayer to object to the payment. Should, however, the auditor allow the expenditure—a very unlikely thing—the objection can be carried to the Court of Queen's Bench, with the certainty that the payment will be disallowed, and the members of the Board will find themselves compelled to refund the sum, and liable besides for a considerable amount of costs. It is useless to argue with such men as constitute the majority of the Sheerness Board. The chairman is evidently proof against common sense. Because gas was once supplied to the town at a loss, he expects the company always to continue the ruinous proceeding, and failing to persuade them to do so, he would be rash enough to commit the ratepayers to the unprofitable speculation. A little more consideration may, after all, bring the Board to reason, and induce them to accept one of the alternative proceedings offered by the gas company.

On Thursday, July 7, the Secretary to the Board of Trade was asked by Mr. Stephen Cave whether he had observed, in the report of the recent meeting of the Gas Managers Association, allusions to some important and unexpected results of experiments instituted by the gas referees, and whether those results would be made public; and, further, whether the Board of Trade contemplated the early extension to the whole metropolis of the principle of the Gas Acts of 1868-9. As regards the first question, we may state our belief that no one but Mr. Ohren has heard of any important and unexpected results arrived at in experiments instituted by the referees, which must, of course, be made public if obtained; but such results as have been obtained Mr. Lefevre promises to lay before the House of Commons. To the second question Mr. Shaw Lefevre replied that there was no intention at present to apply the principle of the Acts named to the whole of the metropolis, although he admitted the advisability of uniform legislation.

We publish, in another place, two communications on photometry. That by Mr. Wilkinson proposes a somewhat novel arrangement for ascertaining the quality of gas, which may deserve attention. The principle will be seen to be the same as that of Erdmann's gas-prover; and Mr. Wilkinson has added the meters and other apparatus as originally suggested by Schilling. If it can be satisfactorily established that, at the average temperature and pressure of the atmosphere, the consumption of 0·2 of a foot of air is equivalent to one candle, Mr. Wilkinson's method will be found a useful practical test. Some further account of the experiments by which he determined this point is desirable.

Another correspondent writes in defence of candles. The objections to these are numerous and obvious, but they have at the same time many recommendations. By attending to all the points suggested by J. B., most of the objections to their use would be obviated, and we have no doubt fairly uniform results obtained.

With this number is issued the seventh supplemental sheet of drawings of the new works of the Chartered Gas Company at Beckton.

Correspondence.

GAS-BURNERS.

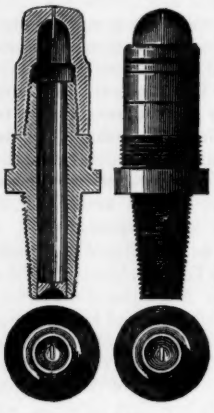
Sir,—In the very interesting address of the President of the Gas Managers Association, so fully and ably reported in your columns of the 21st ult., page 483, Brönner's patent gas-burners are most favourably alluded to, but the president has added an observation or two in reference to a burner by Mr. Sugg, that we fear will convey erroneous impressions to your readers, inasmuch as it is said that with "four sizes of Mr. Sugg's burner the same objects can be obtained as by Brönner's eight or nine." With this statement we beg most respectfully to differ, and affirm that the very fact of having yourself to arrange and set a moveable regulator to accomplish an economy and obtain a maximum light is in itself a considerable objection rather than an advantage, when the results required can be at once obtained by selecting from the eleven sizes of Brönner's.

There is no difficulty in the selection, as each burner has stamped upon it the number of feet of gas it will burn per hour, which quantity has been ascertained to the greatest nicety by most careful

tests prior to its being stamped, so that to a mathematical accuracy may be calculated what quantity of gas is consumed, without reference to the meter-index. The principle can in no way be tampered with by servants, so as to increase the consumption, and it cannot otherwise be injured or destroyed except wilfully so. This we affirm cannot be said of Mr. Sugg's new burners, or of any other having moveable regulators, which, of course, can be altered by any one so disposed, and its object of ensuring economy and a set light defeated.

In selecting the size of Brönner's, it is only necessary to decide upon the amount of light required (taps turned full on) hence if it be required to have equal light obtainable from any other burner, it will be found that Brönner's two or three sizes less will give the desired results, with the very important addition of a considerable saving over the burner displaced, for it must be borne in mind that no more gas is admitted into the Brönner burner than is absolutely consumed; therefore, with perfect combustion, a light of great brilliancy is obtained with far less gas than was required for the burner superseded.

FIG. 1 FIG. 2



It will be seen, by reference to the annexed sketch, that the formation of the burner-heads are not alike. These differ according to the size of the burner, and so regulate the shape of the flame. When the burner is required to be used in globes, the head takes the character as in fig. 1; and for open-air burners or without globes, as in fig. 2.

Further, all hissing or flaring up will be wholly counteracted, however great the pressure, much less heat will be given off, and the atmosphere of the room rendered free from that stifling feeling so much experienced from burners of any other kind—features which will obtain the expressed approval of gas consumers, and rid gas managers of those chronic complaints as to badness of gas, defective supply and illuminating power, unsatisfactory meter returns, &c.

We beg, sir, you will do us the favour of giving insertion to these remarks in your next impression, so that it may not be thought that the Brönner burner is surpassed or equalled, and permit us to add we shall be most happy to demonstrate our statements to any one who may favour us with a visit.

HENRY GREENE AND SON.

16 *and* 17, *King William Street, E.C., July* 4, 1870.

ON MEASURING THE LUMINOSITY OF GAS.

SIR,—Having for some time past paid considerable attention to photometry, I have felt the necessity, in common with others, of a better standard measure for the illuminating power of gas than the sperm candle. A measure always varying in size is, to say the least of it, an absurdity; yet this is the fact regarding the recognized standard measure for the illuminating power of gas. I believe the candle has yet to be made that will give the same amount of light on two consecutive trials for even ten minutes. I have frequently seen, when by merely putting out the candle, weighing, and relighting it, a difference in reading off the photometer of two candles, sometimes in favour of the candle, at others in favour of the gas, whilst at the same time a difference in the consumption of sperm of 4 or 6 grains, and the corrected 120-grain result varying one or two candles; the meter registering exactly the same quantity on each occasion.

Many attempts have been made to supersede the candle measure, but none has been found much more satisfactory to the public, or even to engineers generally. Amongst the numerous methods proposed, I may name two that stand more prominent than the rest —Lowe's jet, and the lamps using sperm and colza oil.

Lowe's jet, in the hands of careful and observant engineers and managers, is very useful in giving the relative value of any two gases, when corrected for difference of barometric pressure, temperature, and the quantity passing through the meter in a given time is observed, as all these influence this burner in the same way as they do others; therefore it is of importance that the quantity used in a given time, the atmospheric pressure and temperature, as well as the height of flame and pressure at the burner, be observed to be of much use.

The same objections hold against the lamps as the candle—that is, the difference in the quality of oils and wick, as both these articles vary as much as the candles, being liable to the same imperfections in the manufacture. It is well known that the slightest speck of dust, or difference in the twist or plait of the wick, interferes with the ultimate results of the experiments, so much as in many cases to vitiate the test altogether.

Some years ago there appeared in the JOURNAL OF GAS LIGHTING a description of a "gas-tester," proposed by Mr. Erdmann, of Vienna, if I remember rightly, which impressed me as being in the right direction. It consisted of a Bunsen burner, with a long narrow slit to admit the air, and a cover marked to indicate the size of the opening; but as the quantity of air passing to the burner was not known, the instrument was defective. After many trials, with more or less success, I gave the thing up as being of little use, except for giving the comparative value of any two or more gases tested at the same time.

Believing, as I do, that many advantages will be derived by adopting AIR as the standard measure of the luminosity of gas—amongst them I may name its universal presence—whenever we want to test gas, there it is, without cost; always with the same proportions of the two important gases, oxygen and nitrogen, forming the great bulk of the atmosphere, or at any rate with so little variation that no instrument or method we have can detect it, except in very rare and special circumstances; nor does it depend upon any manufacturing processes for its purity.

With the view of testing the practicability of using the atmosphere as the standard measure of the luminosity of gas, I some time ago commenced a series of experiments, and after various methods had been tried, the following was adopted, which is so far satisfactory that I venture, with your permission, to place before your readers some of the results.

The apparatus I am using is a modified Bunsen's burner, made rather longer than usual, with two stop-cocks at the bottom of the pillar or tube—one cock for admitting the gas, and the other air. A wide glass chimney, 2½ inches diameter and 7 inches long, or in daylight a tin shade, with a slip of glass fixed in the side divided into inches and tenths. The inside is blacked and marked. The gas is passed through an experimental meter, with index showing hourly rate of consumption and quantity passed in decimals of a foot. A governor, a King's gauge, and a thermometer are fixed between the meter and the burner. The bulb of the thermometer is inserted within the gas-tube.

The gas is first admitted to the burner in such quantity that the flame reaches 4 inches high.* When it becomes steady, which will be in a few seconds, if the burner is constructed properly, and having a wire gauze fitted underneath the shade to prevent the currents interfering, the air is admitted from a small gasholder and meter fitted with gauge, governor, thermometer, &c., precisely in the same manner as the gas-meter.

When the air and gas are regulated so that the white light disappears, leaving a cone, or rather a double cone, of pale bluish light, and the inner cone showing a very slight tip of white light occasionally, but not continuous, the states of both meters are read off and noted down. The air and gas are allowed to burn until the gas-meter registers 0·1 of a foot of gas, when the air is stopped by turning the stop-cock at the bottom of the burner pillar; the states of the thermometers and meters are then examined, noted, and the experiment is completed.

Supposing the meters stand when taken after the air is admitted to the gas, and the white light has disappeared, say—

Gas	34·60 commence.
T. 69°; B. 29·5″ .	·10 consumed.
	34·70 end. Gas equal 16·20 candles.
Air	76·260 commence.
T. 69°; B. 29·5″ .	76·584 end.
	·324 consumed.

By moving the decimal point one figure to the right of the quantity of air consumed, we shall have the quantity of air one cubic foot of the gas under examination requires to saturate or take away the light-giving portion.

In the example above it will be 3·24 gas × 5 = 16·20 candles; if there is any difference in the temperature of the air and gas, it must be calculated and allowed.

I use as the standard measure or unit 0·2 of air at T. 60°, B. 30″ for one candle, which I believe, from a great number of experiments, amounting to many hundreds, is nearer the absolute illuminating power of gas than can be obtained by the candle test.

There are some interferences which at one time were perplexing, but I have no doubt they will disapper *altogether* shortly; and I will just observe that if anything in the atmosphere interferes with the results by the method now proposed, *it must influence all the modes now in use*, as it plays a very important part, next only to the gas itself, in all these investigations; in fact, we cannot move one step in them without being dependent upon the atmosphere.

Further investigations are in progress, in order to ascertain the effects of heat, vapour, &c. When they are completed I may ask for a little more of your valuable space.

JONATHAN WILKINSON,
Gas Examiner of the Sheffield Corporation.

Grimesthorpe, Sheffield, July 14, 1870.

SPERM CANDLE.

SIR,—The able and exhaustive lecture on photometry, by Messrs. Kirkham and Sugg, seems to have given the *coup de grâce* to the sperm candle as a standard of comparison. To some extent my own observations coincide with theirs, as to the varying results obtainable in the use of the candle. Before, however, finally abandoning the old standard, which has the recommendation of simplicity, it would be well to inquire whether it is not capable of being so used as to ensure at least tolerable uniformity. I apprehend that spermaceti as a substance is as little, or perhaps less, liable to variation in quality than vegetable oil, which is not only subject to season influences, but to a chemical process of refinement not always alike in its effect. As the burner is to the gas, so is the wick to the candle; and as a bad burner cannot indicate the true illuminating power, so inattention to the form and condition of the wick will equally fail to give satisfactory results in the use of the candle.

About three years ago I was struck by the occasional discrepancy in the *estimated*, as compared with the ascertained photometric value

* This height of 4 inches exactly is not essential to the success of the experiment, but is useful as a Lowe's jet or duration test by attending to the pressure, quantity, and time. The principal thing, after regulating the light, is the pressure; it must be kept even during the experiments.

of the gas. This led to an attempt to find some method of burning the candles so as to obtain more uniform results. The experiments extended over several months, and were made without reference to the support of any particular theory, and attained I think a fair amount of success; at any rate, since adopting the moderately curved wick, consuming about 130 grains, and burning with a bright red nose, ignited portion of wick a little over half an inch in length, I have been quite satisfied with the correctness of my experiments.

The tabulated results are at your service, but would occupy too much space to print, even if they were of sufficient importance, as they do not assume to be more than a step in the direction of a better mode of working with the sperm candle. The experiments and deductions are fairly open to criticism, and possibly other conclusions may be drawn from the figures; but the purpose will have been served if they throw any light on a most important and interesting question. I append a short summary of the tables.

Table A shows the difference in results by a mere alteration of the length and form of the wick. *Ex. gr.*—June 11: Estimated value of gas 14 candles; three experiments; same gas immediately following; same candles used:—

No. 1.—Wick short, quick curve . . .	118½ gr.	=	13·36 cand.
2.—Wick moderately long, easy curve.	129 ,,	=	14·10 ,,
3.—Wick long, nearly upright. . .	129 ,,	=	15·02 ,,

Again, on the 19th of October, when the long wick was pushed to an extreme point, the difference was 3·53.

Table B.—Experiments with short and moderately long wicks, the short wick giving a lower illuminating power to the gas by about half a candle.

Table C.—Experiments with stout-wicked candles.

Table D.—Experiments with candles burning normally, and trimmed to consume about 120 grains.

Table E illustrates uniform results obtainable by careful attention to the length and form of the wick. Two experiments, closely following each other, were made on each occasion; candles burning normally; experiments conducted, as far as possible, under like conditions; extreme difference in 18 double experiments under 1-5th of a candle.

Table F.—Experiments with candles only; short wicks against moderate—say 6-16ths or 7-16ths against 8-16ths or 9-16ths.

The conclusions derivable from the tables appear to be—

1. That the long upright wick consumes the sperm so imperfectly that 14-candle gas is made 1 or 2 candles higher.

2. That the short wick, whether moderately or strongly curved, or hooked, is one-half to three-quarters of a candle against the gas.

3. That the wick of moderate length—say 8-16ths or 9-16ths—burning normally, and consuming 127 to 132 grains or thereabouts, with a bright red nose, and a flame 1¾ inch to 2 inches in length, is capable of giving very uniform results.

4. That, as a rule, a consumption of 120 grains or under is against the gas one-half or three-quarters of a candle.

The candle will seldom arrive at a proper state of burning under 20 minutes, and the experiment should not be started unless the wick be of the proper curvature and length, and burning away with a *bright* red nose, and a steady clear flame about 2 inches in length. No reliance can be placed on a flame 1¾ inch or under.

The lamp may ultimately—perhaps soon—supersede the candle; still it is desirable, so long as we have the old standard, to do all we can to obtain the best results possible, and this is my object in sending these rough notes. Most likely the gas referees will feel it necessary to "justify the continued adoption of the candle," by showing it is not necessarily an uncertain standard.

J. B.

Hull, July 14, 1870.

Parliamentary Intelligence.

HOUSE OF LORDS.

Monday, July 4, 1870.

The following Bills received the Royal Assent:—The Yeovil Improvement; Leeds Corporation Gas, &c.; Halifax Water, &c.; Dublin Corporation Water; Skipton Water; and Brighton and Hove General Gas.

The Reading Local Board of Health Bill was reported from the Select Committee, with amendments.

Tuesday, July 5.

The Ashton-under-Lyne, Stalybridge, and Dukinfield (District) Water Bill was read a third time, with the amendments, passed, and sent to the Commons.

Thursday, July 7.

The Oldham Corporation Water, &c., Bill, and the Rotherham and Kimberworth Local Board of Health Bill, were reported from the Select Committee, with amendments.

The Reading Local Board of Health Bill was read a third time, with the amendments, passed, and sent to the Commons.

The Littlehampton Water Bill was returned from the Commons, agreed to, with amendments.

Friday, July 8.

The Littlehampton Water Bill.—The Commons amendments were considered, and agreed to.

The Enniskillen Borough Improvement Bill was reported, with amendments.

The Rotherham and Kimberworth Local Board of Health Bill was read a third time, with the amendments, passed, and sent to the Commons.

The Gaslight and Coke Company's Bill, and the Newcastle and Gateshead Water Bill, were returned from the Commons, with the amendments agreed to.

The St. Helen's Gas Bill was returned from the Commons, agreed to, with amendments.

Tuesday, July 12.

The Salford Borough Improvement; Birmingham Water; and Ashton-under-Lyne, Stalybridge, and Dukinfield (District) Water Bills, were returned from the Commons, with the amendments agreed to.

The Enniskillen Borough Improvement Bill was read a third time, with the amendments, passed, and sent to the Commons.

Thursday, July 14.

The following Bills received the Royal Assent:—The Littlehampton Water; Gaslight and Coke Company; Newcastle and Gateshead Water; Birmingham Water; Salford Borough Improvement; and Ashton-under-Lyne, Stalybridge, and Dukinfield (District) Water.

The Oldham Corporation Water, &c., Bill was read a third time, with the amendments, passed, and sent to the Commons.

The Reading Local Board of Health Bill was returned from the Commons, with the amendments agreed to.

Friday, July 15.

The Rotherham and Kimberworth Local Board of Health Bill was returned from the Commons, with the amendments agreed to.

HOUSE OF COMMONS.

Monday, July 4, 1870.

The St. Helen's Gas Bill, as amended, was considered.

Wednesday, July 6.

The Littlehampton Water Bill was read a third time, and passed.

The Birmingham Water Bill, as amended, was considered.

Thursday, July 7.

The Gaslight and Coke Company, and the Newcastle and Gateshead Water Bills.—The Lords amendments were agreed to.

The St. Helen's Gas Bill was read a third time, and passed, with amendments.

Metropolis Gas.

Mr. Stephen Cave asked the Secretary to the Board of Trade whether he had observed, in the report of the recent meeting of the Gas Managers Association, allusions to some important and unexpected results of experiments instituted by the gas referees, and whether those results will be made public; and whether the board contemplate the early extension to the whole metropolis of the principle of the gas Acts of 1868-9.

Mr. Shaw Lefevre: I will lay on the table of the House the reports to which the right honourable gentleman alludes, though I think the importance of them is much overrated by the right honourable gentleman. With regard to the second question, I admit the extreme advisability of uniform gas legislation for the metropolis; but I am unable at present to pledge the Government to bring in a bill for that purpose.

Monday, July 11.

The Ashton-under-Lyne, Stalybridge, and Dukinfield (District) Water Bill.—The Lords amendments agreed to, with amendments.

The Salford Borough Improvement.—The Lords amendments were agreed to.

The Birmingham Water Bill was read a third time, and passed, with amendments.

Tuesday, July 12.

The Reading Local Board of Health Bill.—The Lords amendments were agreed to.

Thursday, July 14.

The Rotherham and Kimberworth Local Board of Health Bill.—The Lords amendments were agreed to.

HOUSE OF COMMONS.

(*Before Mr.* E. Baines, *Chairman; Mr.* Norman Grosvenor, *Mr.* Broadley, *and Mr.* Verner. *Sir* John Duckworth *sat as Referee.*)

ST. HELEN'S GAS BILL.

Wednesday, June 22.

Mr. Mundell, Q.C., and Mr. Coates appeared for the promoters, the St. Helen's Gas Company; Mr. Rodwell, Q.C., and Mr. Thomas for the Corporation of St. Helen's, petitioners against the bill.

Mr. Mundell, in opening the case, gave a history of the company from its establishment in the year 1832, as reported in the Journal for March 29, in the proceedings upon this bill in the House of Lords. He also stated at some length the circumstances under which the corporation acquired power, in the St. Helen's Improvement Act of last session, to negotiate with the company for the purchase of their undertaking, and the conditions under which they placed themselves in the event of the company being willing to become vendors. The company, he said, declined, as they had a perfect right to do, to sell their property; but in the petition against this bill the corporation alleged this refusal as a ground of complaint against them. The company, however, maintained that the corporation were not in a condition to purchase, even if they were disposed to sell. By the 376th section of the Improvement Act the corporation were authorized to borrow £100,000, to be applied to certain objects in a given order. First, in discharging the costs, charges, and expenses preliminary to and incidental to the obtaining of their incorporation and of that Act; secondly, in discharging, according to their priorities, the moneys borrowed by the local authorities of Sutton and Parr; thirdly, in discharging the outstanding debts of those townships; fourthly, in paying the costs of purchasing the waterworks; and lastly, in paying the costs of obtaining the works of the gas company, if the proprietors were willing to sell the same. Until the previous charges were disposed of the corporation could not undertake the purchase of the gas-works, and in meeting those previous charges the sum they were authorized to raise would be so far exhausted that they would not be in a position to provide that expense. The objects of the present bill were as stated in the preamble—viz., to extend the limits of supply, and to raise additional capital. There was also a further object arising out of the petition with reference to the price and illuminating power of the gas. Up to June, 1869, the company had expended £40,087. Since that date they had been obliged to lay out for main-pipes, at the instance of the corporation, £2100. Their parliamentary expenses in that year were £668, and there were some other small sums which made up the sum to £43,185 17s. 8d. They required in their business a floating capital of £4091 15s. 3d., so that their entire expenditure on capital account was £47,277 12s. 11d. Their whole share capital was £46,000, of which £45,200 had been issued. With a growing consumption, therefore, it was evident that they were obliged to come to Parliament for more money, and when the bill came before the House of Lords they asked for an addition of £92,000. They failed, however, to satisfy their lordships on this doint, and the sum they were authorized to raise was limited to £24,000. The company agreed that no profit should be made by their shareholders from the issue of new shares; that they should be sold by auction, and that any premiums thereby realized should be regarded as capital not bearing interest. The dividend on the new capital, if issued as preference stock, was fixed at 6 per cent.; and if as ordinary shares, at 7 per cent. The company had also been authorized to borrow £11,500 in respect of their old capital, and £6000 in respect of their new capital, which gave them altogether, as additional capital, £41,500. During the past 37 years of their existence the average dividend had been £6 1s. 6d. per cent., and the company had no reserve-fund. Their present productive power was only equal to the estimated increase of consumption during the next

two years, and it was calculated that within four or five years a capital expenditure of about £30,000 would have to be made. Having referred to the extended limits of supply as fixed by the bill as amended in the House of Lords, the learned counsel said the only other points to which it was necessary to draw attention were those of the illuminating power and price. In the bill as it originally stood the company left their present maximum, 5s., untouched with regard to the borough, but they asked for power to charge a differential rate of 6s. in the outlying districts, and the illuminating power was fixed at 14 candles, as provided for in the corporation bill of last session. The House of Lords thought the illuminating power sufficient, but they limited the price to 4s. 6d. per 1000 cubic feet over the whole district. The company considered that this was a reasonable price, and they hoped the committee would be of the same opinion. In the interval between the bill passing the House of Lords and the present time, there had been great agitation in St. Helen's. Public meetings had been held, and statements had been made there which were not supported by evidence. The committee would probably hear that there was a strong feeling in favour of the price of gas being reduced to 3s. 6d., on some fancied analogy supposed to exist between St. Helen's and Wigan and Warrington. Under the influence of this supposition persons had been induced to sign a petition against the bill, and a petition was also presented by the mayor, aldermen, and burgesses in opposition. There had been a growing feeling of late that corporations ought not to spend public money in opposing or promoting private bills, and the St. Helen's Company applied to the Court of Chancery for an injunction to restrain the petitioners from defraying the costs of their opposition out of the borough fund. Vice-Chancellor Stuart, however, decided against the company.

Sir J. DUCKWORTH: What have we to do with that?

Mr. MUNDELL said he was merely stating the facts connected with the bill in the order of their occurrence. He then proceeded to read and comment upon the clauses of the petition, and expressed a hope that the committee would be of opinion, when they had heard the evidence, that no case had been made out to justify the refusal of the powers asked for by the company.

Mr. *William Pritchard*, examined by Mr. COATES.

I have been manager of the St. Helen's Gas-Works since 1852, and have had apart from that considerable experience in the erection and management of gas-works. The St. Helen's Gas Company was incorporated in 1832 with a share capital of £6000, and borrowing powers to the extent of £1500. The limits of supply were about 12,000 acres, which included the townships of Sutton-Parr, Eccleston, and Windle. By 1852 the capital was expended, as well as the sum of £1210 out of profits. We were reincorporated by a fresh Act in 1852, which contained the same limits as the old Act. Our capital was then £46,000, with £1500 renewed borrowing powers. We make up our accounts each year to the 30th of June. We make out another account at Christmas for an interim dividend. The dividends are paid in September and March. Up to June, 1869, we had expended £40,087 3s. Since then the corporation have compelled us to extend the mains to the extent of £2100. It is about 8½ miles. There are some items for parliamentary expenses last year, and some little outstanding matters that will bring the whole thing to £43,185 17s. 8d. up to March. We require a floating capital of £4207 17s. 5d. That floating capital consists partly of stock in hand, and partly of customers accounts to be received; there was a quarter's account due then. A large portion of that sum will be expended in payment of dividends, if we can get our accounts in quick enough. Adding this floating capital from one to the other they make up £47,277 12s. 11d. We have calls outstanding amounting to £600. As regards our producing capacity we have 178 mouthpieces at work, and we can produce by them 434,750 cubic feet per day. Our total manufacture for the year ending June 30, 1869, was 57,625,000 cubic feet; amount of gas sold, 41,727,000 feet, leaving unaccounted for, 15,904,000 feet, showing a leakage of 27½ per cent. The highest average of leakage was 28 per cent. in one half year. For over eight years it was 32 per cent. Since 1865 we have reduced the leakage from 32 to 27½ per cent. I do not think we shall be able to reduce it to any much greater extent. There are unusual causes to produce this leakage—viz., the subsidence of the ground, and the great deal of acid in the ground composing the streets, which injures the main iron service-pipes and corrodes them very soon. As the subsidence causes the joints to draw, it is very difficult for some time to find out where the leakage takes place. It sometimes gets into the sewers. Our length of main is a little over 31 miles. We have 2100 services. Considering the present condition of the works, I calculate we shall have to expend £23,620 in the next five years to keep pace with the probable increase in St. Helen's and the neighbourhood, but that does not include land; £24,000 might get us on for seven years, but it will be spent by that time entirely, and we shall have to come again to Parliament for fresh capital. I was present last year during the contest over the St. Helen's Act. I heard Mr. Mundell's opening speech, and it was quite correct. The corporation's first requirement with regard to extension was that we should lay 800 yards of pipes from Redgate Bridge—from the end of the existing main to Blackbrook Bridge. That would have taken us to the edge of Haydock. Haydock there is almost a continuation of St. Helen's for about 1500 yards. It is a very populous place. One side of it is nearly one block of houses, but the other side is not so full. There are no public lamps there, but I think it expedient that there should be. The canal bridge is a dangerous approach from the Haydock side. It is not good from either side. It is a swivel bridge, and is constantly opening and shutting. We did not extend our pipes nearer than 400 yards of Haydock, because they only gave us four lamps, and stopped there. Under the Act of 1869 we had a right to one lamp to every 100 yards. The corporation can compel us to go to any part of the borough if they give us an average of one lamp per 100 yards. At any time they may take us to the boundary of Haydock. Under the present contract with regard to public lights, the corporation are to be supplied at 5*s.* per 1000 feet, and 25 per cent. off. They are bound to supply them at the lowest price charged to any consumer, which is 3*s.* 2*d.* An agreement was made with the London and North-Western Railway Company and with the Glass Company in 1868, the effect of which was to give them a discount of 25 per cent. if they consumed a million feet per annum. That was before we came to Parliament. There has been no reduction made under that contract. I consider our expenditure is careful. I am not aware of any way in which the cost of manufacture could be reduced. We have about 2100 consumers. There are a vast number of small consumers, and three-quarters of them are below £3 per annum. The whole borough consists very much of a scattered population. The dividend account produced is correct. [The same was handed to witness, and shows the average dividend paid from 1833 to 1851 at an average of £3 8s. 5d. per cent. on the 19 years, and from 1852 to 1869 an average of £8 17s. 7d. per cent. on the 18 years.] I have a paper also showing the capital required [handed in], and it is as follows:—

Capital Required to be Spent within a Limited Period to meet the Increasing Demand.

Additional retort-house, equal to 196 mouthpieces, at £32 . .	£6,270
Set of 12-inch condensers and 2 vertical scrubbers	800
Purifying-house, 4 purifiers, 12 feet square, with centre-valve and connectors	1,400
Duplicate 8-horse power engine and boiler, exhauster, and pumps	900
New buildings, foundation, &c.	1,000
Two gasholders, with a capacity for 380,000 feet, with brick tanks, &c.	8,250
Main-pipes on works and streets . . . . . (say)	5,000
Total	£23,620

Cross-examined by Mr. THOMAS: Our mains are laid to light 3800 acres. The mass of our customers lie pretty close together in the old commissioners district. We have 6000 acres within the borough and 6000 without. We have a good connexion out of that district. We supply the Sutton Glass Works, but do not go any farther. We do not supply any works below it [referring to plan]. Before we get over the boundary of Haydock we shall have to carry the main over another canal bridge. I do not know whether the canal or railway company are about to light that already. There are no lamps on the dangerous bridge. There are oil lamps there which are kept by the railway company. We have no mains in our extra-municipal district at the Eccleston side. We have lamps at Windle. We supply 380,000 feet outside the borough. We do not supply Marshall's Cross; we should have done, but the corporation stopped us. They would not take the lamps any farther than the Grange. We have had this district within our limits since 1832.

Mr. THOMAS [referring to map]: Why do you want to go to Ashton, having so large a portion of your existing district unsupplied?

Witness: At this end of Ashton [pointing to map] there are houses that wish to take gas, and we could not break up the streets without getting that power. The company would not go where it would not be profitable. I know of no reason, except those houses at the corner, why the company should go to Ashton. The place may grow up; it is a very nice country district. With regard to Haydock, we propose in the bill to be under the same duties and obligations as we are under with respect to the supply of gas at St. Helen's. We must charge the current price at Haydock. We propose to put ourselves under a more stringent obligation at Haydock than we are at any other part of our existing district, because perhaps it will be more profitable. It will not be more expensive to supply Haydock than to supply additional customers within our existing limits within the borough, because it is continuous up to Blackbrook. I am aware we come under the obligation to supply it within twelve months after the passing of the Act. I do not think it is likely to be a profitable thing at present, but it would improve very much. There will be a little loss, but I do not think it will be much; I do not think it will have a tendency to keep up the price of gas at St. Helen's. There is no local board or other body at Haydock who would be able to contract with us for public lamps. They are about to form one. We could get an indemnification from Mr. Evans, the coal proprietor; he would, no doubt, guarantee us until a local board was formed. In the last bill we proposed to charge 6*s.* in Haydock. The Haydock people petitioned against us. I do not know if Mr. Evans pays 3*s.* 9*d.* or not for his gas at Newton. At the time of the petition we were extremely anxious to get some extension of limits.

Mr. THOMAS: You wanted, as a ground for additional capital, to have some extension of the limits in your bill?

Witness: Yes, to a small extent.

Mr. THOMAS: Then you went and settled practically with the Haydock people, and after the preamble was proved, and the corporation had gone, you and the Haydock people put the clause into the bill with reference to their supply?

Witness: I believe it was so. By the year 1852, £1210 had been paid out of profits to capital account. Then we were required to offer all the new shares to the existing proprietors for the purpose of recouping them—that was 600 shares at £10 each. They had, for recoupment, these shares with £2 credit as paid, although not really paid upon them. In 1853 there was a bonus of 20 per cent. on the £6000. That £1200 was capitalized.

Sir J. DUCKWORTH: It was not divided.

Cross-examination resumed: In the abstract of accounts for 1853 there is £6000 issue of shares; 2400 shares were issued according to that, and a £2 10*s.* call is stated there to have been made. The £6000 was actually paid, with the exception of the £1200, and not credited by the shareholders. By the 1852 Act we had power to borrow £1500. We have borrowed it on mortgage. I believe we paid it off out of the revenue account, but I must look for that. I do not believe it was the same year we earned enough to pay 10 per cent. We propose, when the profits exceed 10 per cent., to pay up the dividend to the extent of £5330. There is always a subsidence at St. Helen's. We have more perfect fractures; it is always subsiding and drawing. Subsidence is not diminishing. We have had no immediate fracture lately. In reference to the new capital required, there is an additional retort-house wanted. It will be for extensions; we can go on a little bit with what we have. We have got something like 20 million feet a year surplus power. We manufactured in 24 hours, last Christmas, in the shortest day, 327,500 feet, and we have power to make 434,750 feet. The surplus capacity is about 100,000 cubic feet per day. Assuming we have a new condenser and purifying-house, we should be about equal to double what we are supplying now; that is what we shall require, supposing we go on in the same ratio that we have been going on hitherto. I am calculating on St. Helen's going on in the same ratio as it has done in the last eight years. Our gas is good, but, notwithstanding, there are a few private gas-works in the borough. There is one next door. That was a question of price. We have no very great facility for getting coal; the same as other people nearly. The Wigan Gas Company have power to go to Ashton, but they have never gone near it yet. We petitioned against the corporation bill last year, on the ground that it was not right, that Parliament was not in the habit of granting a concurrent jurisdiction to gas companies, and that it would be wasteful. Warrington is nine or ten miles from St. Helen's. Both places are about equidistant from Wigan. The best gas coal in the county is at Wigan. We use gas coal, but not of such a good quality. We have it there on the spot, saving the carriage from Wigan.

By the COMMITTEE: We do not get any from Wigan.

By Mr. THOMAS: I remember an application by the commissioners, in 1867, to the company to supply gas at a reduced price. We could not alter from the low price that we were then charging them. In 1862 the ratepayers came and asked for a reduction, and this letter [produced] was sent in reply.

Mr. THOMAS: In those two letters there was a good deal said about the straggling character of the district, but the acid did not seem to have been found out. Was there none in those days?

Witness: Yes; but there was not so much as there is now—it keeps growing. Two gentlemen who are relators in the Chancery suit are two of our directors.

Re-examined by Mr. COATES: The district is a straggling one. There are many long lengths not filled up with houses at all when the gas-mains are laid. The custom of the place is that a manufacture is put down in some convenient spot, and by degrees a cluster of houses arise around it for workpeople. The people of Haydock are in favour of the bill now. The surveyor of highways is among those who have signed the petition. I expect we shall get a considerable profit at Haydock with a very small expenditure of money. Mr. Evans lays down his own mains. That would be a considerable element in his price. No company has power to supply Haydock at present. Wigan does not oppose us in our coming for powers to supply Ashton. There has been since 1852 an accumulation of unpaid dividends of £5332. The whole town of St. Helen's is honeycombed by coal mines. Some of the workings are filled up with water. They are now pumping out the water in order to get to the upper parts that are worked. If the superincumbent soil loses the support of this water underneath, the probability is it will go down again. The town is drawing in in nearly every direction. The quantity of manufactures has considerably increased since 1862. Those manufactories discharge products which are left on the street, and form acid; therefore the corrosion has materially increased since 1862. In 1865 we allowed a discount of 25 per cent. Probably if that discount had been adopted earlier we should not have had so many of these gas-works. Those people are not inclined to sacrifice their plant, having put it up for gas-making purposes.

By Mr. THOMAS: In my account of residual products, I have tar, £503; coke,

£553; ammoniacal liquor, £86. That is a fair average for the year. We have 11 miles of mains outside the mile radius from the works. We have not much outside the new boundary that has only been existing for twelve months.

By Mr. COATES: There are 20 miles outside the old commissioners boundary.

By the COMMITTEE: The average leakage of the Runcorn Gas-Works, where there is no subsidence, was from 10 to 12 per cent.

By Mr. COATES: We have at present rather a favourable contract for the cannel coal. I think it will last for three or four years more. We have got about half the town. I am afraid we are not likely to get it renewed on the same terms.

THURSDAY, JUNE 23.

Dr. *Edward P. Twyford*, examined by Mr. WHEELER.

I practice at St. Helen's, am a magistrate of the county, and a director and deputy-chairman of the gas company, with the concerns of which I am well acquainted. In 1869 and 1870 negotiations passed between the corporation and the company as to public lighting. The letters related to the extension of the mains. There were many extensions—altogether 19,000 yards. It was proposed that mains should be extended 800 yards in the direction of Haydock from the old main. The corporation proposed to erect only four lamps in those 800 yards, whereas by their Improvement Act they were bound to give a lamp to every 100 yards. We explained to them their position, and their proposal was withdrawn. A second proposal required us to extend our mains, in various directions, for something like eight miles. Since then the company have expended £2500 in extensions. In that scheme the mains were taken up to a point within 400 yards of Haydock. The corporation did not like to place the additional lamps. They have still the power to compel the company to take their mains to Haydock. St. Helen's and Haydock are continuous places, the population of the latter being about 6000. It is, in fact, but one community.

Cross-examined by Mr. THOMAS: We thought we were entitled to have eight lamps on the 800 yards, whereas the corporation only proposed to give four. Now there will be a lamp to every 100 yards, as they have accepted our interpretation of clause 82 in their Improvement Act. In 400 yards there is not one house I believe. In the next 200 there are two or three houses and the Roman Catholic church, and then the population begins to increase. Two canal bridges will also have to be lighted. The population of Haydock township is 3600, but it is a rapidly increasing place. We only propose to take our mains where it would pay us to do so. I think we should be *bonâ fide* supplying Haydock if we went into the populous part of it. I advocated a differential rate for Haydock when the bill was before the House of Lords, but I have changed my opinion since. There are large collieries in the vicinity. Mr. Evans, a colliery proprietor, is supplied from the gas-works at Newton, at the price of 4s. per 1000, I believe. We propose 4s. 6d. for Haydock. We proposed 5s. originally, but the Lords cut us down to 4s. 6d.; 5s. is the existing rate. Some large consumers pay us only 3s. 9d. I was one of the gentlemen concerned in the Chancery suit in the interest of the gas company. We tried to stop the opposition in that way but failed. Our £10 shares have sold this year at £16 10s.

Re-examined by Mr. WHEELER: Clause 4 does not require us to take our mains to wheat or turnip fields. We intend only to go where we can make a profit. We are not compelled to supply gas even to St. Helen's unless it suits us to do so. It may have cost us £300 to take our main 400 yards on the road to Haydock. It is a rapidly increasing place. The Newton Gas Company have no powers in Haydock; they cannot break up the roads. At present the main goes through private property, it being laid by Mr. Evans himself.

Mr. *J. Davis*, examined by Mr. MUNDELL.

I am an accountant living at Warrington, and have recently been elected auditor for the St. Helen's Gas Company. The accounts of the company have been fairly and properly kept.

Cross-examined by Mr. THOMAS: In 1869 the amount charged for the repair of mains was £92 4s. 8d.; in 1868, £78 17s. 8d.; in 1867, £116 18s. 5d. I consider those to be small items comparatively with the amount charged in the accounts of other companies.

Mr. *Amos Hansom*, examined by Mr. COATES.

I am a land surveyor and mining agent of St. Helen's. A considerable part of the town and borough is undermined by the working of the collieries, and it has caused subsidence to a great extent. The houses and public buildings have considerable fractures in them. [Photographs produced.] The refuse from the copper-works is used in the making of the roads. There is a great deal of acid held in suspension in the atmosphere of St. Helen's, and when it rains it falls, percolates into the soil, and operates upon the slag. I have known the ground to subside seven or eight feet. The Haydock boundary is about a mile from the gas-works.

Cross-examined by Mr. THOMAS: I should expect that all mains alike would be broken by the subsidence. The pipes get corroded. The mining operations are going on now, and may continue for the next 50 years. The piers at the old works gradually crumble away and let down the surface.

Mr. *E. Fidler*, examined by Mr. WHEELER.

I am a mining engineer and coal proprietor at St. Helen's. The town is honeycombed by collieries. The water has sustained the evil, but in the absence of it the soil falls in. Fresh collieries are being opened. The workings of the colliery extend under the houses and the streets. The pillars that are left are not sufficient to support the soil under a great portion of the town. The company's works have been considerably interfered with. The slag and refuse from the copper-works have been the principal road-making materials for the last 50 years. I see no analogy between St. Helen's and Wigan so far as furnishing gas at one and the same price goes. In the Wigan district they get a far superior cannel than they do at St. Helen's. The Wigan Company have had a very favourable contract for three or four years, and they are about to renew it out, when I expect they will have to pay an extra 30 per cent. At St. Helen's they use far inferior cannel, and a bad kind of coke is produced. The subsidence at Wigan has been much more partial than at St. Helen's. The slag has a very bad effect upon the pipes.

Cross-examined by Mr. THOMAS: The ground is honeycombed under Wigan to the same extent as it is at St. Helen's, but the pillars are left in a dry state. At Wigan the consumption is more condensed, or more compact round the gas-works. The price of coke at St. Helen's is not more than 5s.; at Wigan it is 6s. 8d. per ton. The distance between the two towns is about ten miles. The price of cannel at Wigan cannot be less than 30 per cent. dearer than it was ten years ago.

Mr. *Alfred E. Fletcher*, examined by Mr. COATES.

I am a member of the Chemical Society, and since the passing of the Alkali Act have been the Government inspector for the St. Helen's district. I have examined the soil in the streets of that town, and also the gas-pipes laid therein. I found a considerable amount of corrosion in the wrought-iron pipes. In one case the pipe was so much corroded that gas was escaping through a hole formed in it. The streets are made principally of slag from the smelting works, brick rubbish, and cinders and clinkers from the furnaces. The atmosphere of St. Helen's is largely impregnated with acid vapours and sulphur from the immense combustion of coal at the chemical and other works. Those acids are held in suspension, and eventually are washed down by the rain; they then find their way through the soil, and come in contact with the slag and cinders. A chemical action is then set up which has a very destructive effect upon the pipes; the acids act corrosively upon the iron pipes when they come in contact with them. The effect is different under the flagstones of the streets. The corrosion is far less there than under the roadway where the water has a freer access to the pipes. The leakage in the pipes must be continuous, and it is difficult to find it out. The quantity of these noxious acids is startling. I mean the quantity from the coals and various sources of sulphur. There is as much sulphur thrown into the air as would produce 86,796 tons of oil of vitriol per annum. The excessive corrosion of the pipes in St. Helen's is due to the nature of the soil, which is composed of cinders, materially assisted by the action of the acid fluids. Coal cinders are highly corrosive; they act galvanically in contact with iron, and also as sponges to soak up and retain the acid fluid.

Cross-examined by Mr. THOMAS: I have examined the gas-pipes at the instance of the company. There was a complaint that the pipes were corroding. I examined them first about three years ago. The cinders touched the pipes in many cases. I have seen pipes laid for 30 years that have not materially corroded. It all depends upon the nature of the soil in which they are laid. Ashes will corrode a pipe. Cast iron is much less easily acted upon by corrosive agents than wrought iron. I suppose that lead would last much longer. The experiments made upon the air of towns have been rather of a comparative character. The amount of one acid has been compared with the amount of another—not the amount per cubic foot, and so forth—I mean the amount of hydrochloric acid and sulphuric acid. Wishing to be quite sure that the pipes were corroded by the soil and the acids in it, I protected one pipe three years ago from all contact. This spring it was dug up, and was found to have the original bloom of the metal upon it, whilst the fellow pipe, buried as usual in the soil, was highly corroded. If the pipes were laid in sand they would be protected. In the report of Dr. Angus Smith the quantities of hydrochloric acid in Manchester and St. Helen's are stated to be, in Manchester, 110·83, and in St. Helen's, 148·54; of sulphuric acid, in Manchester, 979·17, and in St. Helen's, 1002·99. The pipes in Manchester are laid in cinders. The laying of a pipe in cinders, without any acids at all, would tend to corrode it. Carbonate of lime in the soil would have a neutralizing effect on the acids. I have compared Liverpool sand, carbonate of lime, and cinders, and find the corrosion least in the Liverpool sand. To remedy this state of things at St. Helen's, the pipes would have to be taken up and relaid in some protecting material, which would be a very expensive affair.

Dr. *Henry Letheby*, examined by Mr. WHEELER.

I have inspected the gas-works at St. Helen's, and found them to be in a very good condition. They have 115 double-mouth retorts, producing about 60 million feet of gas per annum, and with a capacity for making 20 millions more. The illuminating power was good. The gas contained rather an excess of ammonia —9 grains of sulphur in about 100 feet, which is about one-third of the quantity in the London gas. I considered it very good gas. There was considerable subsidence of the soil in the town. Many of the houses were shored up or supported. I took samples of the soil of which the roads were made, and I was surprised to find the acids. I had the streets opened in 22 places. [Samples of corrosion produced.] I took it from a service-pipe passing from the main to a house. The iron was completely corroded. Oxide of iron is produced by the action of the acid on the pipe. When the corrosive matter was taken off, it was found that the pipe was completely corroded, and that the gas was escaping. There were holes as big as my finger. There appears to be a great necessity for the supply of gas to Haydock. There would be no difficulty in lighting it from the St. Helen's works. There ought certainly to be a testing of the gas. I am the gas examiner of the City of London. The machinery there is very expensive, costing about £3000 a year. The cost is divided between five companies. It is expected that the whole of the companies will have to contribute. It would not be felt in London, but the expense would be a very serious thing in the country.

Cross-examined by Mr. THOMAS: I think the companies are as much interested in the testing as the consumers. There should be a continuous testing. A company is protected if there is a public officer. A thousand yards is the distance generally for the testing-places, and they are mostly at the companies offices. An officer of the corporation could go there every night to test the gas and see that justice was done. I found the illuminating power of the gas at St. Helen's between 19 and 20 candles. They do not use very fine cannel coal.

Re-examined by Mr. WHEELER: Under the City of London Gas Act the testing is three times a night at each of the testing-houses. There are at present four such houses, and two or three others are being fitted up. A tester will be appointed for each office. The test apparatus at St. Helen's was satisfactory. In London any officer of the company may be present during the testing. There would always be suspicion if both parties had not free access. It matters not whether the testing takes place at the office of the company or at that of the corporation, so long as it is open to all.

Mr. *J. Harvey*, examined by Mr. COATES.

I am the chief agent for the Messrs. Evans, large colliery proprietors at Haydock. They employ about 2600 men, and the rateable value of their property is £3000 out of the total of £14,000. The feeling generally is in favour of the St. Helen's Company supplying Haydock. The inhabitants have petitioned in favour of the bill.

Cross-examined by Mr. THOMAS: Messrs. Evans signed a petition to the Lords against the bill, but it was upon certain grounds. The great majority of the inhabitants of Haydock are working colliers. Messrs. Evans are quite satisfied with the terms of the bill. Our main objection to the bill as originally drawn was the differential rate of 1s. for the gas in Haydock. The lawyers drew the petition up; 470 houses out of 895 are occupied by our own people. There is not the same amount of subsidence of the soil at Haydock as at St. Helen's. The houses are built on those parts where the coal mines are exhausted.

Mr. *J. E. Pardey*, examined by Mr. WHEELER.

I am land agent for Mr. W. J. Legh, M.P. for East Cheshire, the owner of the whole of the land comprising the town of Haydock. I concur in the evidence of the last witness.

Mr. *T. Shirlock*, examined by Mr. COATES.

I have been in business for 40 years at St. Helen's, and am a gas consumer. I commenced when the company started, in 1832. St. Helen's is a struggling town. The subsidence is apparent to every one. I am satisfied with the way in which I have been treated by the company, both as regards the quality of the gas and the price charged for it.

Cross-examined by Mr. RODWELL: I think that the company can manage the supply better than the corporation. I believe that the company will reduce their price as soon as they can afford it. Originally we were charged 10s. 6d.; now it is 5s. I am content to trust to their judgment, honesty, and power. The feeling of St. Helen's is generally in favour of the company. I think they ought to be allowed to go to Haydock and supply gas there at the same price as at St. Helen's. The interests of both places are identical. It was believed that a great injustice would be done to the company if they were obliged to supply gas at 3s. 6d.

Thomas Hawksley, Esq., examined by Mr. MUNDELL.

I am a civil engineer of at least 40 years experience in gas and other works, and am well acquainted with the town of St. Helen's, having known it since it was a village almost. It is a place which is still likely to go on increasing in population and industrial pursuits. The district within which the gas-works at present supply their gas is about 12,000 acres; but a very large portion of it is purely agricultural, where no pipes whatever are laid, and in many parts of it will not be laid. The district is one very unfavourable for gas-works, from the subsidence of the soil, and the effect of the peculiar manufacture of alkali, and the refuse from those works, which is very destructive, as is also the condensed acid vapour which proceeds from the chimneys. It was intended to take the great main water-pipe to Liverpool, through St. Helen's, but we found it would be a very dangerous thing to lay pipes in the vicinity of those alkali works. A special investigation was made, and it turned out to be so unfavourable with respect to the action of the waste or refuse from the works, with which the roads were made in some degree, as also the action of the acid vapour and acid water

upon metals, that we were obliged to come to Parliament to get an alteration of the line of pipe, and to carry it away from there. There were not many roads made of the refuse at that time, but afterwards they became raised by the refuse from the manufactories, which began to increase greatly. The effect of the roads subsiding is to create fractures in the gas-pipes, but more ordinarily it draws the joints, and so establishes a leakage. In the case of the Liverpool main, that effect has been produced to a large extent in other parts of its course through this coal district. It is quite a common incident from the operation of coal-mining upon the service; it destroys the pipes and causes leakage, both of the water and of the gas, and is eminently injurious and destructive There is also the oxidation of the pipes from the sulphuric acid in the soil, which exists in a much larger extent on wrought-iron service-pipes than on cast-iron ones. The action on wrought-iron is very rapid indeed, and it has the same effect on water as well as on gas mains. It is all external, of course. The same effects are produced in the pipes of the Sunderland and South Shields Water-Works, where there is alkali waste, or acids flowing from alkali works. It increases the leakage of the service-pipes more than in the mains. The amount of leakage at St. Helen's is now 27½ per cent., and it was higher when they were passing through the pipes a smaller quantity of gas then they are passing now. The absolute amount of leakage then bore a higher ratio to the quantity of gas made than it does now, and if we can double the quantity going through the mains, as a matter of course the ratio would decline. The mains have comparatively but a small number of customers upon them in proportion to their length. There were only 2000 customers on more than 22 miles originally. In ordinary works the leakage is about a sixth; in pipes that are laid in good ground—new red sandstone, for instance—it would diminish. At Warrington, it is only 10 or 12 per cent.; at Liverpool, 12 or 14. I consider the works at St. Helen's well situated for the supply of the district. They adjoin a brook at the lowest eastern part of the town. The denser part of the town is somewhat more to the west, but not very far. The works occupy about 3½ acres. I think it would not be wise to erect further works in that locality. An additional gasholder might certainly be erected, but that is all. There is a small holder in another part of the town, not now in use. If the consumption goes on increasing, as in all probability it will, it would be much more economical to have subsidiary works elsewhere. It is always best to have the works as near as possible to the place to be supplied, as it saves expense in mains, whilst the distribution is more equal. In many cases there are two, or three, or four different works, and in one town there are five. At Nottingham there were three, distributed in a triangle, and by means of their position they served more readily and with much less cost in main power; because if the supply had come from one work, the pipes towards the works would have had to be enlarged, and the cost would have been considerable. It is more economical and useful in a variety of ways, taking into consideration the absolute cost, superintendence, and everything else. We generally get the works established at some place where the rates are lower, where the communication is good for the purpose of manufacture, and so on. The area of the present works is capable of dealing with 80 million cubic feet per annum. At present the make is about 60 millions. We should require to lay out our increased capital almost immediately, because works like those at St. Helen's increase at the rate of 9 per cent. per annum, which is equal to a complete duplication of the manufacture every eight years. That is the common ratio in busy manufacturing places. It is doubled in every eight years, so that in sixteen you get a gas-work four times the size. At St. Helen's the manufacture has increased in proportion to the expenditure. It is proposed by the bill to raise £24,000 of additional share capital. The shares are to be sold by auction, so that the premiums on the shares will not bear interest as capital, and that must be a great advantage to the town. Supposing the shares are sold subject to 7 per cent., they will produce £10 or £14, and of course the £24,000 will be increased in the same ratio. When the bill was introduced I asked for £46,000 more. The whole would be exhausted in about 16 or 18 years. I explained to the committee of the House of Lords that it was inexpedient that a company should have to come to Parliament oftener than about 15 or 16 years—the cost of the application is so enormous, as also the trouble given to the members. Formerly 30 years used to be the time. There are many instances in which Parliament has granted a much larger capital in proportion to the original capital than the £92,000 you have asked for. At Nottingham our capital has been increased from the year 1840 or thereabouts from £40,000 to £400,000. At Bolton it has been increased fourfold, and it has been found to be very advantageous, for the people have got gas at a cheaper rate. When an article is cheap the people increase the consumption of it. If the shares are sold at St. Helen's, as I apprehend they will be, then there will be more than £30,000 raised, and that sum would unquestionably be expended in seven years. The works must be brought up at once to their full manufacturing power, and that will cost a few thousand pounds. Within two years of their capability being exhausted, new works must be commenced, in order to meet the excess of demand whenever it may arise. It is always best, when there is an obligation to sell shares by public auction, to raise the money by sale rather than by borrowing. All the persons who find capital are rowing in the same boat then, whereas if you borrow a part of the money they raise it cheaper in that way than they do by borrowing. Suppose you borrow a large part, then the lenders would have a preferential claim upon the undertaking, which is not desirable. I recommend that the share capital should be exhausted first. If times were unfavourable, and the shares could not be got out of the market at their reasonable ordinary average value, then it would be desirable to take up for a time money on loan. The limit of the borrowing powers, I think, is a fourth of the capital. It would not be desirable that all the new works that are wanted should be done out of borrowed capital. I never heard of such a thing as a gas company having some one appointed over their heads to direct when they should lay their money out and when they should not. Those who risk the capital must have the control of their own operations; it would be absurd to imagine anything else. The mains for the most part do not go into a remunerative district, but they are laid fairly enough. The corporation are lighting the outskirts of the town, and by-and-by those places which are not now covered with houses will be, and therefore I find no fault with the exercise of the corporation. It was proposed originally to go to the edge of the district, about 800 yards in the direction of Haydock, but upon the modified plan that has been reduced to 400. There is a bridge at the edge of the district which will require lighting in the interest of the public. At the bridge it begins to get populous. There is a long road, a mile and a half, with houses continuous. Haydock and St. Helen's is all one community, and it is desirable there should be lamps along that road. Though it is not within the area of the borough, it is part of the population of the place, just as much as the road going out by Hammersmith is a part of London. There are about 3000 people in that part of Haydock. It would not tend to reduce the price of gas, because St. Helen's is a denser place than Haydock, and in proportion there would be a greater mileage of pipes, but the manufacturing expense would be the same in all. There is a little larger mileage of pipes in proportion in these out-districts than there would be in St. Helen's. I believe it would be much more remunerative to the company to go to Haydock than some of the outlying places along which the corporation themselves have required the company to lay their pipes. What is good outside of St. Helen's is good inside. You cannot separate these people, and say some are Britishers and the others are Frenchmen; they are all the St. Helen's population—they live and trade together. I would not limit myself only to Haydock; I should take a broad view as to the duty of the company which had undertaken to supply the population of and in the neighbourhood of a large town; they must take the good with the bad, and do their duty to the community, whether they live in dense groups or more openly spread places. If a village were to spring up, detached by half a mile or a mile of road, in which there were no houses, it would be the duty of the gas company to carry light to it. It is not meant that they shall call out a very profitable district, and leave the people in a less populated district unlighted. All is to be treated as one community. The average cost per mile of going into Haydock would be about £480—a very insignificant part of the capital. They ought to lay three miles of pipes; the present requiring to be laid along the road is a mile and a half, but the road branches out a little each way, and they ought to have pipes in them.

Mr. MUNDELL: The opponents ask that, if the limits of supply be conferred, the company should be required to keep separate accounts of all outlay on such additional works as might be sanctioned beyond the borough or its present limits, and prevent the company bringing such charges into the accounts of the existing undertaking. Is that practicable?

Witness: Not by any means. It never could be agreed, and there might be much litigation and arbitration about it. You could not separate the accounts accurately. There would be a great number of elements to determine, which would be exceedingly difficult. You would have to say how much gas flowed along each mile of pipe, and a great many other things. Practically the company supplied 18-candle gas. In the bill they were only bound to supply 14-candle, but a question arose in the Lords as to whether the price should be reduced or whether the illuminating power should be raised, and it was decided to reduce the price and to leave the illuminating power where it was. We ask for 14 candles in our bill. The cost of a candle in the illuminating power is, as nearly as possible, 3d. I told the committee the consumers could either have 16 candles with a maximum of 5s., or 14 candles with a maximum of 4s. 6d. The Lords decided to lower the price and to leave the illuminating power as it stood. If we were to supply the people of St. Helen's with a worse kind of gas we should lose customers. It is the interest of all classes to have gas of a high illuminating power, but I am sorry to say the public generally appreciate the question of price more than quality. That is a great mistake, I think. If the price is to be retained at 4s. 6d., I think the illuminating power might be very fairly 16 candles; but you must allow a margin besides, in order that you may not incur any risk with the test inspector. Sixpence in the price would more than reduce the dividend 2 per cent., and therefore to reduce the price by that amount is a serious matter. We expect to get an increase of consumption at 4s. 6d., otherwise we could not pay a dividend of 10 per cent., bearing in mind the large amount of leakage and other matters, and especially considering the bad market there is for coke at St. Helen's. Three-fourths of the coal used is necessarily cannel, in order to produce the quality of gas which is saleable there, and therefore three-fourths of the coke is bad coke. The price of cannel varies a good deal in that district. I have known it to increase 50 per cent. within a few months. The residual products do not tend to reduce the price as at Birmingham, where they are coke manufacturers.

Cross-examined by Mr. RODWELL: I consider Haydock to be a portion of the same community as St. Helen's. It may have a different poor-law union and police division. I consider it sufficiently near to St. Helen's Gas-Works to be supplied by them. They can conveniently supply gas within a certain radius. I have always said that, within a radius of two or three miles, one price ought to obtain; but beyond that it is fair to charge the consumers who may be resident far away, and if not very densely packed together, 3d. a mile that distance. The meaning of clause 4 in the bill—"that the company shall, within twelve months after the passing of this Act, proceed *bonâ fide* to supply the said township"—is that the company should not leave Haydock, as it were, between two stools after they had got their Act, but they should supply the place *bonâ fide*. There is no obligation. They could not get their supply from Newton more advantageously. The profits on the gas consumed at Haydock will at first be considerably less than the profits on the gas consumed at St. Helen's by some interest on the expenditure of perhaps about £1000 in laying the pipes. There may be a difference of a penny or twopence per 1000 feet. I cannot say there will be so many as 500 customers at Haydock; there may be 500 houses and about 4000 people there. There are usually customers to the number of half the houses. The company will not be compelled to supply any persons living in Haydock. The words "*bonâ fide* to supply the said township" are inserted by the Haydock people, and not by the promoters of the bill. St. Helen's is most favourably situated for coal, and yet, such is the magnitude of the consumption, that it is by no means cheap there. The average price at present is about 10s. 4½d. Three-fourths of it is supplied at 10s. 9d., and one-fourth at 9s. 3d. They could not supply 20 millions more cubic feet with their present capital; but the works they have now, when improved to a certain extent, would enable them to make about 80 million feet per annum.

FRIDAY, JUNE 24.

Thomas Hawksley, Esq., re-examined by Mr. MUNDELL.

I know it to be a fact that Haydock and St. Helen's are practically the same community. The main which I have previously mentioned will enable us to supply a certain portion of Ashton-in-Mackerfield. The roads that pass on the one hand from St. Helen's to Ashton, and the road from St. Helen's to Newton, diverge, and of course at that point the pipes would diverge. Many buildings are being erected on the corresponding line of road in Ashton-in-Mackerfield. Collieries have been opened, and there are indications of a large growth of population. These points diverge 50 or 100 yards within the new limits of Ashton. With a diverging main we shall be able to supply both districts, and that will economize the cost of mains. The meaning of this clause is that we shall supply *bonâ fide* in the same manner as we should in our own limits. We did not draw it; it was put in by those who were then opponents of the bill, and who became supporters of it on condition of having the same privileges at Haydock as those possessed by St. Helen's. Of course the Haydock authorities will not lay lines of pipes and pay for gas excepting where there is a population to be benefited, and then it becomes a reasonable and a legal duty on the company's part to afford the supply. That is the only obligation except those general obligations in the Gas-Works Clauses Act.

By Sir JOHN DUCKWORTH: With regard to lamps to every 100 yards, if you only have public lamps the mains need not be very large; 100 yards a lamp would, I suppose, in a country district, take from 12,000 to 14,000 feet of gas, and would pay about £2 10s. Such a pipe would be laid at the cost of about 3s. per yard, 100 yards costing £15. We should get from it a revenue of about £2 10s., and that being 16 per cent. on the cost of piping. Taking off the cost of the gas, about 3-5ths of that amount, which would leave 30s., it would leave about £1 to pay the cost of £15. That is about 7 per cent., and that comes exactly (although I have never made the calculation before) to the limit of the dividend paid. In fact, we should only pay 5 per cent.

By Mr. MUNDELL: They can demand the lighting for a year. They do not demand it for ten months only, as in St. Helen's. Our duty in Haydock remains as to the whole. A lamp in 100 yards just about pays itself.

By Sir JOHN DUCKWORTH: The lamps and posts are in addition. They ar put up by the public body.

Thomas G. Barlow, Esq., examined by Mr. MUNDELL.

I am a civil and consulting gas engineer of some 35 years experience. I have been concerned in nearly all the large gas companies, and have acted for many corporations. I have recently inspected the St. Helen's Gas-Works. They are in a fair and good condition, and well suited for the purpose of lighting the district. I agree with Mr. Hawksley generally in his evidence, including the causes of the exceptional leakage. I assume the increase will be about 10 per cent. per annum, and that that would exhaust their productive capacity in about two years. It is certainly desirable that there should be new works or extensions. I have examined the accounts of the company. The works are carried on economically. The expended capital represents £38,000 actually spent on the works, and the rest parliamentary expenses and other things. The works fairly repre-

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BECKTON

GASHOLDER 80 F

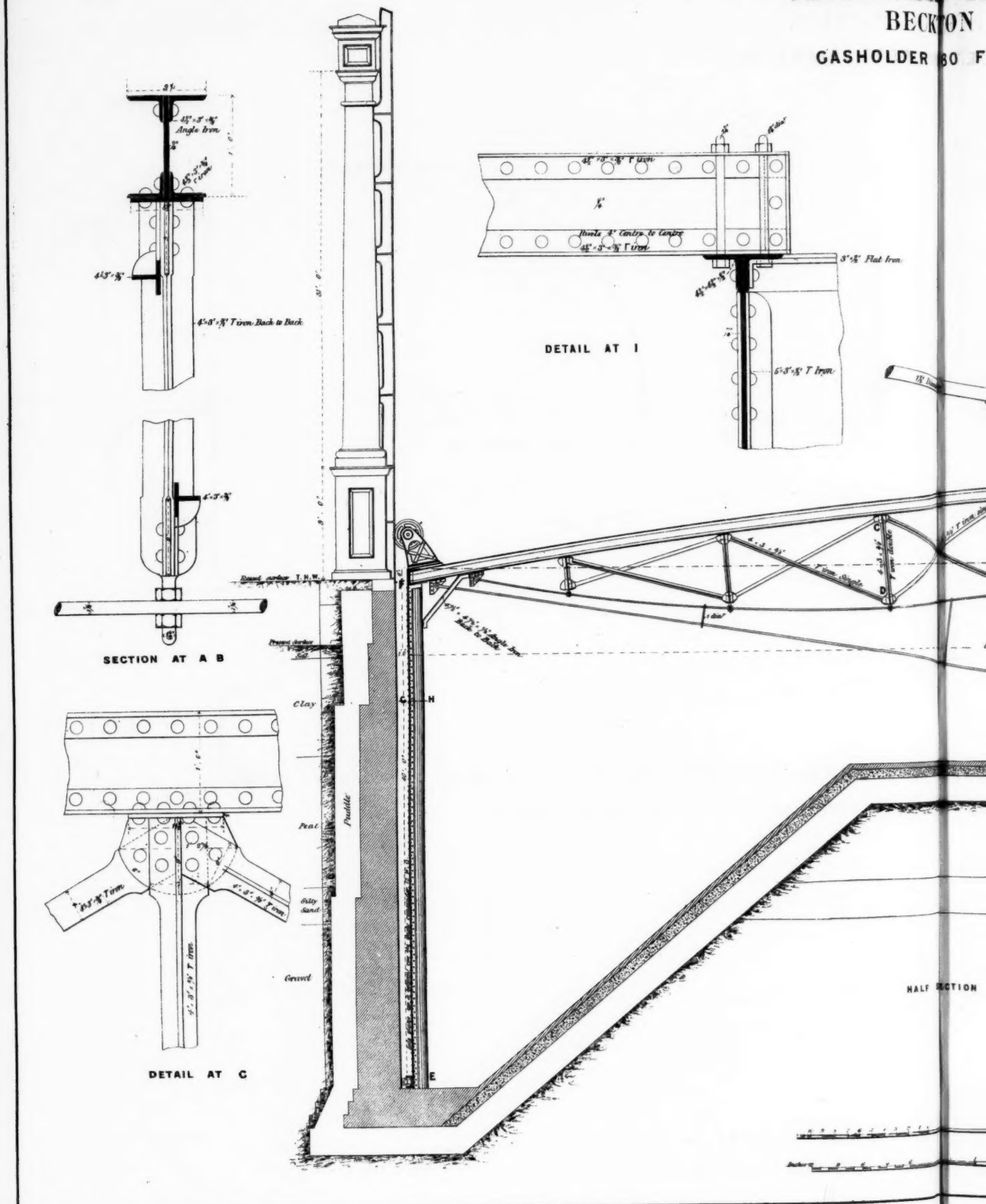

Photo-Lithographed by Whiteman & Bass, London

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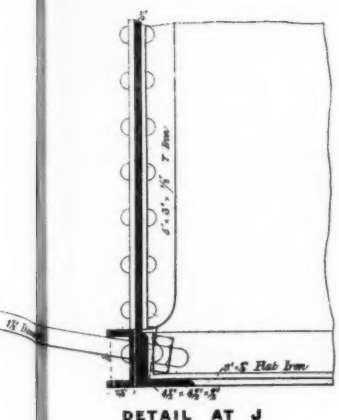

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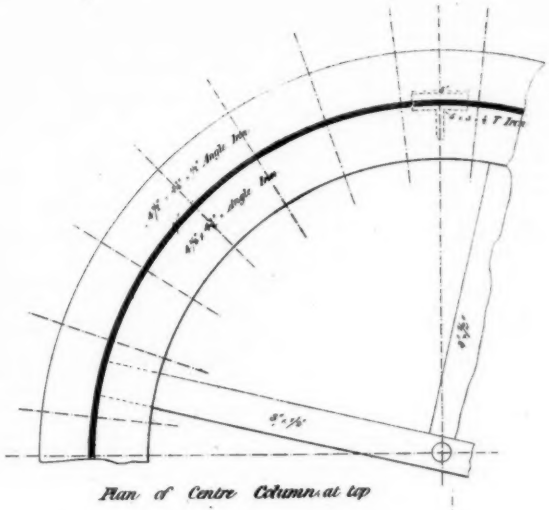
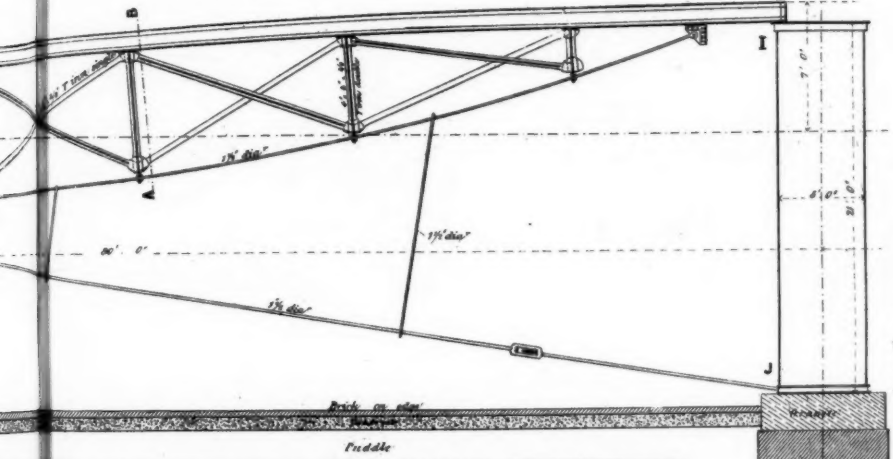
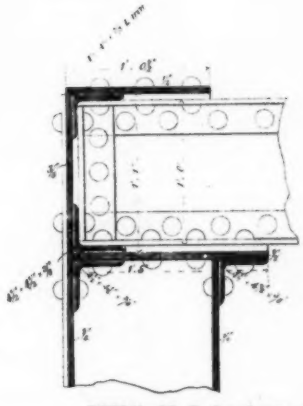


Plan of Centre Column at top



ALF SECTION OF TANK & GASHOLDER



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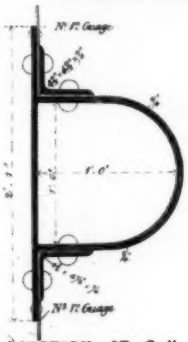

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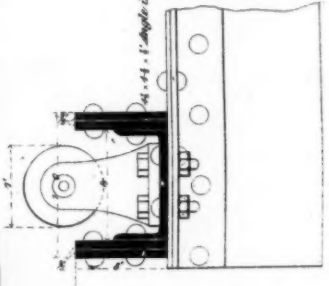

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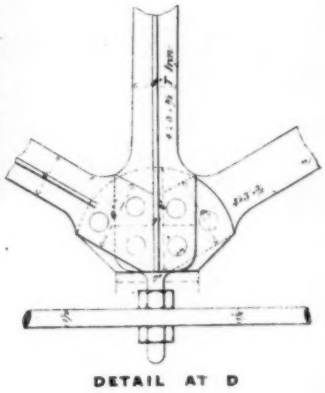


DETAIL AT D

sent that sum. The reduction in price of gas to 4s. 6d. would only leave 7½ per cent. upon the present consumption, and as the consumption increases as the unexhausted capacity of the works diminishes, that per centage will be increased, and there is a possibility in the three or four years of their getting 10 per cent. The reduction will strike off 2½ per cent. from their profits. I think it desirable the company should go into the Haydock district. I think it would be a profitable investment for them. Raising their money as they will do at 7 per cent., the profit arising from the new district will be greater than 7 per cent., and so benefit St. Helen's. I agree that Haydock is a suburb of St. Helen's, and that there is a continuous street of a mile and a half. I agree that a portion of Ashton could be supplied with advantage by St. Helen's. Ashton is altogether seven miles in length, and there is also a small gas-work in its north-east corner. I believe the Wigan Company, although they have never been there, have a perfect right to go there. The village of Ashton is, I think, equidistant from Wigan and St. Helen's. A great number of small consumers tend to increase the cost to some extent of carrying the works on, and also such a large number of service-pipes for such a small rental. There are 1552 consumers who pay less than £3 a year, 226 at between £3 and £5, and 208 between £5 and £10. There are very few who pay any very large sum in proportion to the number. There is only one who pays £500, and two who pay between £300 and £500 a year. This state of things not only adds to the expense, but also increases the risk of bad debts. In ordinary cases the debts do not amount to above three-quarters per cent. of the gas-rental here in the course of ten years. They have been 1 per cent. For the price at which they were able to pay 10 per cent. dividend, practically they have supplied a better quality of gas than 14-candle, and as good as 18-candle. You must continue to serve customers with the same quality of gas as they have heretofore had, because when they have been in the habit of receiving a good quality you cannot bring it down lower, because you would close their custom. I think that £24,000, with their borrowing powers, will carry the company on for eight or nine years. I am not an advocate for frequent applications to Parliament, for I have seen that a great cost is a detriment. The consumer pays in the end. In this case nearly £4000 has been expended in law, parliamentary expenses, and land. I consider they will sell in Haydock, in the course of a year or two, 2 million feet of gas per annum, at a profit of 1s. 6d. per 1000, or say £150 a year, and I do not think the cost of supplying the existing district will be above £1500, which will be equal to 10 per cent. I cannot conceive it possible that separate accounts could be kept if we went into an outlying district. It is totally unprecedented. I have analyzed the accounts, and find that the cost of production is very moderate. Where the company suffers in the cost of distribution is from heavy leakage, which adds 10d. per 1000 feet to the cost of the gas at the works. I have never heard of an auditor interfering in the conduct of a company's affairs. I have known instances in which borrowing has acted very prejudicially, inasmuch as when a time of pressure comes the company have been called upon to pay back the money, and have found it very difficult to raise it; it is therefore safer and better to raise money by the sale of shares for permanent works, especially if they can get it at 5 per cent. The reduction of the price of gas to 4s. would still further reduce the profits. I agree that the company have no margin. There is no analogy between the cases of Wigan and Warrington. The Wigan Company can supply gas at 1s. 4d. per 1000 feet less than is a fair price in St. Helen's, and the Warrington Company at 1s. 7d. At Wigan they charge 1s. 1d. extra when they are beyond a mile from the works. Their share capital is £52,500, £18,750 being at 10 per cent., £21,250 at 7½, and £12,500 at 5 per cent., giving an average dividend of 7·89 per cent. Their leakage is about 21 per cent. The gas manufactured by them last year was 92,715,000 feet, and the quantity sold was 73,238,000 feet, one-eighth of which was sold beyond the mile radius. That which was sold within the mile would enable them to conduct them much more profitably than the St. Helen's Company. Within the borough their charge is 3s. 6d., and without the borough and beyond a mile it is 4s. 7d. Within the radius the sale last year was 63,111,000 feet, and without the radius 10,127,000 feet. There is a discount at Wigan of 10 per cent. on all consumers of less than 150,000 feet per annum, and 20 per cent. to all above that. The discounts at St. Helen's are upon 150,000 feet 10 per cent., and upon above a million cubic feet (of which there are only five customers) 5 per cent.; therefore every consumer at Wigan, before the company take any profit, has had a discount of 10 per cent., which is not the case at St. Helen's. Their maximum price is 4s. 2d. within the radius, but they do in fact charge 3s. 6d. besides the discounts. Their net profits for 1869 were £5037. There is no reserve-fund at St. Helen's. The Wigan Company have been fortunate in a cannel coal contract. They made a contract some eight or ten years ago, before the large advance in cannel took place. The experience of Wigan must not be taken as a criterion. It would not be cheaper for the St. Helen's Company to buy the Wigan coal. The coal and cannel used by the former is got at Peasly Cross, within about a mile of the works. If they were to go to Wigan they would have to carry it ten or twelve miles. They got better prices for their residual products at Wigan than they did at St. Helen's. The Wigan Company get £1 1s. 9d. for tar, and the St. Helen's get 17s. The Wigan get 6s. for coke, and 8s. for ammoniacal liquor, and the St. Helen's only 5s. 6d. for each, so that all these small matters work out in favour of the Wigan Company. I think at the Wigan works there are structures to a greater amount than their capital. I think a considerable part of them, in the earlier stages of their existence, must have been built out of profits. I should put down the amount spent on those works at £70,000. They were apparently allowed to capitalize £12,500 out of profits; it may have been £30,000 they had spent. The difference in the cost of works would in that way be accounted for at Wigan. Warrington is on the red sandstone formation. They have a solid firm ground in which to lay their pipes; their leakage is a fraction over 10 per cent. They have a good solid foundation for laying their mains. Their charge within this borough is 4s. per 1000 feet, with a discount of 6d. per 1000 for payment within a month; and within one mile beyond the borough boundary it is 4s. 6d. with 6d. discount, and beyond a mile from the borough the charge is 5s. for the same. I understand they have mains both sides of the street where it is wide enough. They have lead services in a great measure, which helps to diminish leakage. There is no comparison whatever as to price between Warrington and St. Helen's. I am engineer for a large company that supply 900 millions a year, and our leakage is 26 or 27 per cent.—it was 30, and we have reduced it to 16, and cannot get it below that. It is caused from the oxidation of the service-pipes principally. It is very much like the St. Helen's case in that particular.

Cross-examined by Mr. RODWELL: I suppose the Warrington Company charge more beyond the mile, because it costs more. I should not object to see a differential rate, if the circumstances were such as to require it, but under these circumstances, I fancy their going into Haydock would pay them 10 per cent. upon the capital expended. There might be a loss in the first year, but I apprehend they would be able to sell amongst these 5000 or 6000 inhabitants of Haydock at least 2 millions a year, and that would give a profit of 1s. 6d. per 1000—£150; the cost is 3s. at the burner. A differential rate is justified where there are unprofitable districts. £1500 additional capital would be required to supply Haydock. The average price of coal and cannel together at St. Helen's is 10s. 2½d. a ton, and 11s. 9d. at Wigan. The raw material is cheaper at St. Helen's, but they get more for the residual products at St. Helen's. They get a little more gas out of a ton of coal at Wigan than at St. Helen's. In St. Helen's it is about 9780 feet to the ton, and at Wigan it is a little under 10,000 feet. The net cost of coal after deducting the products would be about the same in both places. Reckoned upon the quantities of gas registered at the works, the cost is 2s. 2d. per 1000, but reckoned upon the quantity sold as measured by the consumer's meter, the cost is 3s. per 1000 feet, so that the difference is 10d. The average difference in the leakage is 27 in St. Helen's and 21 in Wigan, a difference of 6 per cent. The money value of that is 2½ to the advantage of Wigan. 4s. 6d. is rather an extreme maximum for very large places, but I know instances where 6s. and 7s. are charged. I think the supply at Newton is in the local board's hands, I believe they are charging 5s. per 1000 with 10 per cent. discount. I think a gentleman here said they were supplying Messrs. Evans, at Haydock, at 4s. I do not know that the Newton people have agreed to supply the London and North-Western Railway Company's works at Newton at 3s. 4d. per 1000. I have asked the prices in the adjacent districts, and I found that it was at Prescot 5s. 10d., and at Hayton 7s. At Rainhill the former proprietor charged 6s. 8d., but the new company charged 5s. I believe that at the little works at Ashton-in-Mackerfield they charge 6s. I think the maximum charge at Leeds is 3s. 6d., subject to discounts ranging up to 25 per cent., but the corporation there supply above 450 millions as against 47 millions here. There are difficulties in the way of using lead pipes at St. Helen's, but they are not insuperable. They are used at Warrington, at Preston, and at some other places where the ground is peculiarly prejudicial to wrought-iron pipes. There are only a very few instances in which cast-iron service-pipes are used. I think Dundee is the only place that I know of where in a certain part of the town which has been flooded by the sea they have used cast-iron pipes at considerable cost.

Re-examined by Mr. MUNDELL: The price was 6s. 8d. at Widnes before the last Act in 1867. They have an Act whereby they can charge 5s. 10d. per 1000 feet. As to the cost of coal at St. Helen's, Mr. Hawksley gave 10s. 4d. I can only make 10s. 0½d. out of it. £3047 appears in the balance-sheet as the cost of coal and cannel, and the quantity was 6080 tons. The cost is 11s. 9d. at Wigan. If the cartage is not included, it would go to increase the cost per ton. I see there is £115 odd in the cartage account. That added to my calculation would make up the difference. As to its costing more beyond a mile, there are many places as regards the borough of St. Helen's itself which are farther off than this district of Haydock. On that basis, as regards distance, you might just as well charge a differential rate within the boundary as in Haydock. We have mains very nearly up to Haydock which only at present supply the public lamps, and they would be utilized, and that would be another advantage.

Mr. MUNDELL stated that this was the case for the promoters.

Mr. RODWELL addressed the committee at some length against the preamble of the bill. He said the committee would have gathered from the cross-examination of the witnesses for the promoters what was the real nature of the opposition of the corporation. By the Improvement Act of last session powers were given to the corporation to purchase by agreement the works of the company, and a strong and almost unanimous feeling existed in the borough that it was desirable both the supply of water and gas should be in the hands of the local authority. The company had a perfect right to refuse, as they had done, to sell their works, but the corporation complained that when their bill was before Parliament last year nothing was then said about any intention on the part of the company to come this session to Parliament for such extensive powers and enlarged capital as were now asked, and which, if granted, would preclude the possibility of the corporation at any future time becoming purchasers of the undertaking. There were two points especially towards which the present opposition was directed—first, the proposed extension of the company's district; and second, the maximum price fixed in the bill. On the latter point, if the case of the corporation rested on the evidence of Mr. Barlow alone, he thought that portion of the petition which stated that the inhabitants of St. Helen's ought to be charged at the same rate as the consumers in Wigan and Warrington, was pretty nearly made out. With reference also to the other part of the case, Mr. Barlow made an admission which must be regarded as unfortunate, because, speaking of one or other of the two last-mentioned towns, he said there were differential rates which he seemed almost to justify. What the petitioners against this bill complained of was, that no provision of the kind was introduced, so that the consumers in St. Helen's would have the price of gas kept up to them for the benefit of the outlying districts, in which they had no interest, and Mr. Pritchard said that the supply in those places would at first be a loss to the company. When the corporation came to Parliament last year, they stated, upon the best information they could command, that gas could be supplied to St. Helen's at a maximum of 4s.

Mr. MUNDELL said the corporation proposed nothing of the kind, but the clause was put upon them by Lord Redesdale.

Mr. RODWELL said, at all events, the corporation would not have accepted the bill unless they had satisfied themselves that they could do it. They did accept the bill, and bound themselves, in the event of purchasing the works, to sell gas at that price. It was quite clear that the gas company had been having a good time of it, and without casting any imputation upon them of fraud or deception, he was justified in saying that there had been a good deal of mismanagement—in this sense, that they had not carried on their business, financially, at all events, so economically as they might have done. Otherwise, how could it be explained that they had raised money by calling up shares at 10 per cent. to pay off borrowed money at 5 per cent.? He admitted that they had a right to do it, but who suffered in consequence? The consumers, because the difference between the two came out of their pockets, inasmuch as it postponed the time when a reduction of price might be expected. In considering this case, he asked the committee to look at the antecedents of the company, and not to forget the form in which they presented their bill in the first instance, nor how far they had since departed from their original intention. He also asked them to remember that if the powers sought for by the company were conceded, the corporation would never be in a position to carry into effect the clauses in their Act of last session, which contemplated and provided for the future acquisition of the gas-works, not only because it would require a larger sum than they were authorized to borrow, but also because the added districts were beyond the municipal boundary, over which they could exercise no control. After referring to the Chancery proceedings in connexion with this bill (which have been already reported), the learned counsel said there could be no doubt that those who came before the committee on this occasion came solely on public grounds, and therefore he trusted that the committee would give effect to the prayer of their petition, and see that nothing in the bill was allowed to stand which would have a tendency to postpone the period at which the public and the consumers of gas in St. Helen's would be placed in an equally advantageous position to the inhabitants of other towns of similar character, with regard to the supply of so important and necessary an article as gas.

Mr. *J. M. Wilson*, examined by Mr. THOMAS.

I am a land agent and mining surveyor, and have resided at St. Helen's for many years. The distance from the St. Helen's Gas-Works to the Haydock boundary is 1 mile 5 furlongs. The distance from the gas-works to the extreme boundary of Haydock—Hell Nook—is 5½ miles, making the Newton Gas-Works a mile nearer to the boundary of the township of Haydock than the St. Helen's Gas-Works. The distance from the St. Helen's Gas-Works to the toll-bar at Haydock is 2 miles 1 furlong. It is about a mile further to Mr. Evans's collieries. Nearly all the cottages and dwellings along that road would be unlikely to take gas. I do not know of one collier in all St. Helen's who uses it. Judging from the custom of the country, as I have observed it, I do not think it likely, if there was gas there, that a large proportion of the houses in Haydock would take it. The subsidence is considerably less than it has been. There are collieries at work within the area of the borough. I have not seen any subsidence for the last three or four years within the old commissioners boundary. Outside that, the tendency is to diminish subsidence, for the mines are exhausted as nearly as possible. On the southerly side there will still be subsidences, because there are collieries now being worked there. The collieries in Haydock and Ashton have been in work for years. I contemplate as great an amount of subsidence there as there ever has been in St. Helen's. It will increase from year to year as long as the collieries are being worked. The township of

Ashton is purely agricultural. There are several collieries there. The collieries in Ashton and Newton are both worked by Mr. Evans. Gas is supplied to one colliery from Newton, and to the other from Ashton.

Cross-examined by Mr. MUNDELL: I am not a mining engineer, but a mining surveyor. There may be a trifling subsidence from pumping. I am not aware that damages to a very considerable extent were paid to the St. Helen's Company within a year, in consequence of a subsidence which injured the works. I think that case occurred about three years ago. There is no road leading from the Newton Gas-Works to the boundary of Haydock. Generally, where Newton approaches Haydock the population is more scanty than where the St. Helen's gas district approaches Haydock. There is no road, and when you get into the district there is no population. I do not think the Newton people have power to break up the soil of any road. There is a considerable population all the way from the boundary to the toll-bar.

By Mr. THOMAS: This population to a great extent is composed of cottagers, who, in my opinion, would not take gas.

Mr. *James Paterson*, examined by Mr. THOMAS.

I am a gas engineer, and the manager of the Warrington Gas-Works. Our charge under 100,000 cubic feet for the half year is 4s., with a discount (if paid within a month from the delivery of the account) of 6d. Below 800,000 feet for the half year there is a discount of 7d., bringing down the net cost to 3s. 5d. Above 800,000 feet the discount is 8d., making 3s. 4d. net. That is our smallest rate. We have a differential rate outside the borough. It is 6d. upon the first mile from the borough boundary, or 4s. Exceeding one mile it is 1s., or 4s. 6d.

By Sir J. DUCKWORTH: More than a mile from the borough boundary it is 5s. gross.

By Mr. THOMAS: We produce about 80 million cubic feet per annum. The illuminating power is 18 candles. We are not bound to any particular illuminating power. We use the coking coal of St. Helen's and the Wigan cannel. St. Helen's and Wigan are each about ten miles from Warrington. The carriage is a very fractional additional charge indeed upon the cost of coal. If the St. Helen's Company got some of their coal from Wigan, it would not be an element of material importance. We have every facility for bringing coal by railway in all three towns. In our contracts, the contractors supply the coal into the works. We are paying a dividend of 10 per cent., and have done so for the last ten years. The St. Helen's Gas-Works are capable of producing about 20 million feet more than they are doing at the present time, and I think that will suffice them for about two years—the very extreme limit—and before the expiration of that period they must make arrangements for a further extension of their works. They should begin extending them immediately, in order to put themselves in a proper position for supplying the town at the expiration of that period. Our leakage is about 10 per cent., which is exceptionally small. Our mains are lying under favourable conditions as to subsoil, and we have not any contingencies to meet as to depression such as exist in St. Helen's, consequently our leakage on that account is much less. We have a reserve-fund. The differential rates with us have been rendered desirable by the extent of ground over which our mains are laid before we arrive at any consumption. Reference has been made to Haydock. The case is entirely different there. When the mains are extended by the St. Helen's Company into Haydock they come instantly into possession of a considerable revenue, which justifies this expenditure of capital in that direction. It is a large and populous district, and will pay them well. The expense incurred in laying mains would be very inconsiderable. It would not exceed at the present time about £1000, I think. I think a differential rate is not needed at all in reference to St. Helen's. I do not know as a fact that Messrs. Evans are now supplied from Newton at 3s. 9d. in Haydock. Corporations have facilities for making promises which companies have not, and it is possible that Messrs. Evans may have had that promise made to them.

Cross-examined by Mr. MUNDELL: The capital the St. Helen's Gas Company have received from the House of Lords I consider rather too small for carrying them on beyond seven years. A margin ought certainly to be allowed to provide against contingencies as between the maximum price, and the actual price charged, because there is always a shifting in the price of labour and materials, and in everything that guides the general expenditure; 17 per cent. of leakage is a difference in price of 7½d. That would bring us rather above the price that we should charge if we had the same amount of leakage as at St. Helen's. We produce a greater amount of gas from the same quantity of coal than the St. Helen's Company, and we realize more from our residual products. It would make a difference of about 2d. or so per 1000 feet (that is, 2d. *plus* the difference in the amount of leakage), which makes 4s. 9½d. If there be any comparison in fact, our price of 4s. 6d. is too low.

By the CHAIRMAN: Our average price of coal and cannel together is nearly 14s.

By Mr. MUNDELL: It does not depend upon the price of coal, but upon the quantity of gas we can engender from it. The population of Warrington (within the borough) was 361,000 some years ago. We have 38 miles of mains. Our capital is £48,000, including debenture and share capital. Our capital to produce a million feet is £600; in St. Helen's it is £726. They have to provide interest upon so much more capital than we have in that ratio. I do not mean to say, although their capital is larger than ours, that it has been injudiciously expended. I believe it has been well expended. In Wigan their capital per million is £525, which is exceptionally small. Assuming their accounts to be correct, I think the St. Helen's works are prudently and economically managed. I consider, comparing their balance-sheet with that of the other companies I have seen, their working will compare favourably with that of any company I know, even including the Warrington Company. We find it to the interest of our company to keep up a good quality. As a general rule I should not extend any mains unless I could see my way to 7 or 7½ per cent. profit. The Haydock extension would at once pay on laying down the mains. It would be necessary to make divergencies laterally, in order to supply the mains along the high road, and I should think it would probably bring the expenses up to the figure of £1500.

Re-examined by Mr. THOMAS: The St. Helen's Company have their own coals on the spot, and only have to send to Wigan for the remainder. Whatever advantage we derive from the coal we use, they derive by that means a greater.

Mr. *R. Briery*, examined by Mr. THOMAS.

I am engineer to the Newton Improvement Commissioners. The works shown in the map were put up under my direction. They supply gas in the Newton district to private consumers and to the public lamps. Messrs. Evans are supplied in bulk. They take the gas along their road to their works at Haydock, which are now lighted by that gas. They also supply the post-office and other places at Haydock. From this quarter-day the price will be reduced to 3s. 9d.; we have been supplying it at 4s. net. The resolution to reduce the price was passed in May. We are preparing to supply the London and North-Western Railway Company at the Newton Junction works, at 3s. 3d. net. We make a little over 6 million feet a year. Our original price was 6s.

By the COMMITTEE: We commenced in 1855.

By Mr. THOMAS: We have found the effect of our reductions in an increased consumption. It has increased 25 per cent. each year for the last four years. We anticipate the last reduction will still further increase consumption. Haydock belongs to Mr. Lee. Messrs. Evans are his lessees for the coal, and the majority of the houses are occupied by Mr. Evans's tenants, who work in the collieries. Colliers do not usually take gas when it is available; it is not the custom of the country as I have observed it. Colliers generally get coal cheap. They go to bed very early generally; gas would, therefore, I think, be an unnecessary expense. I am not aware that Messrs. Evans supply the gas that we supply to them to any of the colliers cottages close to their works. We are increasing our works. We contemplate raising our supply about 80 per cent. during the ensuing winter. That will come to about 10 or 12 million feet. Judging from past experience, I think it will pay to sell at the price mentioned. The Ashton Company is a private company. I believe their price is 4s. Subsidence will naturally take place in Haydock whatever company goes there.

Cross-examined by Mr. MUNDELL: I believe there has been a subsidence in the road from the edge of Haydock boundary with St. Helen's up to the toll-bar, and that it is likely to continue. There was a subsidence at Blackbrook. Our gross price before our last reduction was 4s. 6d. Messrs. Evans were charged the net 4s. Messrs. Evans take the gas from us in bulk, and distribute it as they please. They laid down the mains in Haydock at, I suppose, a cost of about £70; 3s. 3d. will not be a remunerative price, but will simply pay its own expenses. This price of 3s. 3d. is altogether exceptional, as the railway company in return are to supply a part of our district with water, which we want very badly; 3s. 4½d. was to be the price without any reference to water supply, and 3s. 3d. with. The sub-committee recommended 3s. 6d. The 3s. 9d. price commenced to-day is net; the gross is 4s. 3d. We are at the present time charging private consumers 5s. gross, or 4s. 6d. net, upon payment within a month. The actual cost at the burner is 3s. 6d.; £2000 has to be laid out in order to supply the railway company. We are not going to supply them under cost price. We shall have an increased make of 80 per cent., bringing in a portion of our works which is now standing idle to remunerate us. We scarcely evade our Act of Parliament, which limits us to supplying Newton. We do not supply Haydock. Messrs. Evans take the gas from us in our parish, and they can do whatever they like with it afterwards, when it has passed the meter. I am not in a position to affirm that we should be able to light in the same manner the whole of Haydock more conveniently than St. Helen's could. We can treat with the Haydock people. There are a dozen houses, perhaps, close to our works. The gas-rate at Newton is 6d. We are a public body, and have to pay off the cost of the works in 30 years under the 10 per cent. table. The lighting-rate is only levied upon property within 100 yards of a lamp.

Re-examined by Mr. THOMAS: In my opinion this private sale is a source of profit to the township. We have been under considerable difficulties from having so small a make. We contemplate still further reduction if the make becomes larger.

Mr. *T. Smith*, examined by Mr. THOMAS.

I am secretary to the Wigan Gas Company. Our present price of gas is 3s. 6d. gross in the borough of Wigan and the outer townships within one mile radius from the works. The price outside the radius is 4s. 7d. The 3s. 6d. price extends 2¼ miles in one direction. There is a discount of 10 per cent. for payment within a month to consumers under 150,000 feet, which brings it to 3s. 1$\frac{5}{10}$d. That is to all the small consumers. The number of those who do not pay within the month is very small compared with the total amount. We allow 20 per cent. off to consumers of more than 150,000 feet. That gives 2s. 9$\frac{6}{10}$d. They all pay within the month. The Wigan portion of the public lamps come in as large consumers, but the township of Ince has a fixed charge of 3s. 2d.

By Mr. MUNDELL: Our total quantity made last year was 92,715,000, and the quantity sold was 73,238,400 feet.

By Mr. THOMAS: The leakage was 21 per cent. for the last year. The average is 24¾ for the last ten years.

Mr. MUNDELL here stated that, although it was not proved in evidence, the St. Helen's average for 8 years was 32 per cent. He could call back their manager to prove it.

Examination resumed: Our prices charged previous to our last Act in 1861 were 4s. 2d. to small, and 3s. 9d. to large consumers, taking 10 per cent. discount off each. We were then selling about 45 million feet. That is about the same quantity that the St. Helen's Company are selling now.

Mr. MUNDELL: Our sale is 41 million.

Examination resumed: The 10 per cent. off the 4s. 2d. brings it down to 3s. 9d. to small, and 3s. 4½d. to large consumers. The Act does not mention the 3s. 9d. price, but it was so. We were then selling to large consumers at that price. Our consumption has increased. Out of our present sale of 73 million the small consumers take 44 million, and the large 29 million. We have a great many customers at a less rate than £3 a year. We have rather more than 40 miles of mains. They are laid mostly in an undermined district. Our lowest leakage was in 1860—20·43 per cent.; we have had it as high as 33½ per cent. Ashton is within our district. We have not gone there. So far, we have not thought it would be profitable; we may do so. The only supply there is that of a joint-stock company with a capital of £4000, of which £3785 is paid up.

Cross-examined by Mr. MUNDELL: We consolidate two companies. Our share on taking up both companies was £18,750. We have paid 10 per cent. ever since getting our Act. We sometimes paid 30 or 40 per cent. before we came under the Gas Clauses Act. We came to Parliament in 1861. We had a sum of £12,500 expended on the works, which is now part of our capital, paying 5 per cent. We had borrowing powers of £21,250, for which we paid 7½ per cent That makes our total capital £52,500. When we came to Parliament we had only a capital of about £31,000, and yet we made 45 million feet of gas. We can at these prices only pay on an average a dividend of 8 per cent. Our reserve-fund is now £9000. Within the borough and a radius of a mile we supply 63 million. The bulk of customers are within a mile radius. When we came to Parliament we had fixed our price at 4s. 2d., and 5s. 6d. for the outer townships. Between the maximum price in our Act and the sum actually charged we have a margin of 8d.

Mr. *Edward Johnson*, examined by Mr. THOMAS.

I am a resident of St. Helen's, and a member of the Town Council. I was formerly one of the Improvement Commissioners, and was one of a deputation of consumers to the company in 1862. We asked them to reduce the price and give us a better quality. A letter was eventually received from Mr. Pritchard, to the effect that they were not in a position at the time to reduce the price on account of the great expense they were put to, in consequence of the subsidence and the straggling character of the district. I was again in a deputation to the company in 1867. The deputation asked them, in case they could not reduce, upon what terms they would sell their undertaking. They refused to sell, and we did not get the reduction. They said we had no power to buy, and that when the town was incorporated the consideration of the purchase might be made, or something to that effect. Last October there was an application to the company to sell. They declined. There is a very strong feeling in the town in favour of a reduction below the 4s. 6d. in the bill. We see all the places round us with cheap gas, and we have what we consider dear gas. There has been a petition, largely signed, sent up from St. Helen's in favour of a reduction. There has been a largely-attended public meeting in the town-hall since this bill came from the House of Lords, with reference to the bill in its present shape, which was called by the deputy-mayor upon a requisition of the ratepayers. The resolutions were passed unanimously. The Town Council generally are opposed to the extension proposed, thinking it will have a detrimental effect upon the price at St. Helen's, and that it will invalidate the permissive power of sale which they now hold.

Cross-examined by Mr. MUNDELL: I think it would be unfair to limit the price to such an amount that the company should not get 10 per cent. upon their old capital, but I do not think that would be the case if we carried our point. I heard Colonel Gamble say, at a meeting on the 29th of April, that he would be sorry to prevent the company from getting their maximum dividend. I took part in that meeting. I believe the people think the company might charge 3s. 6d., and not injure themselves. I am not prepared to say their management has been injudicious.

Re-examined by Mr. THOMAS: Colonel Gamble, though a shareholder in the

company, as mayor has taken part in opposing the bill. I think it would be good for the borough if the works were purchased.

Mr. *L. W. Evans*, examined by Mr. THOMAS.

I am a member of the Town Council, and have been for several years chairman of the Water-Supply Committee under the Improvement Act. The limits of the water supply are identical with the gas limits, and include Sutton, Parr, Eccleston, and Windle.

By Mr. MUNDELL: They have leased the water company. The water supply is vested in us.

By Mr. THOMAS: Our mains are more extensive, I think, than the gas-mains. With regard to subsidence, the cost of repairs of our water-mains is 6s. 8d. per cent. per annum. They are under an internal pressure of 80 lbs. to the inch, so that in the event of any dislocation showing itself, it must be under a much greater strain than it otherwise would be. Probably, in the case of gas-pipes, the pressure may be about a couple of ounces or so. These dislocations must have been felt by the water-mains in common with the gas-mains, because our water-mains more generally pervade the borough than the gas, inasmuch as we are bound to supply every cottage. I agree that there will be less subsidence in future. All the coal mines immediately under St. Helen's, near the surface, are worked out. All the surface mines were worked first, consequently each ten years now increases the average depth of the working by 30 to 50 yards. They are getting to great depths now. Witnesses have given an over-sanguine estimate of the future prosperity of the place. I think there will be an increase, but not in the ratio in which it has gone on up to this time. I believe it was mainly on the ground of our permissive powers of purchase that the gas company succeeded in striking out, in the House of Lords, our power of contracting with other people for supplying the public lamps. All that remained was the permissive power for us to buy and for them to sell the gas at the lowest price charged to ordinary consumers. Our Act passed at the end of the session, and in October we asked their terms of sale. They declined to sell, and in the very next month—November—they published their notices for coming to Parliament for practically trebling their existing capital. It appears more than probable to me that if this bill passes the company are likely to raise our price of 3s. 9d. for public lamps at the end of our contract with them. We desire to take security in the bill against that. I think that such a reduction as may protect the interests of the town is quite consistent with the interests of the gas company.

Cross-examined by Mr. MUNDELL: If I had been a shareholder I should have preferred to have worked the concern with a capital of £36,000 raised in shares, and £9000 borrowed at 4½ per cent., and by so doing I could have effected a saving more than equal to 1 per cent. Instead of availing themselves of a borrowed capital, they have issued shares, and charged the district with 10 per cent. instead of letting the district have the advantage of the borrowed capital at 5 per cent. That is certainly, financially, bad management. I think they have been parsimonious. They should have laid a larger pipe; it would have proved a piece of economy. We took power in our bill last year not only to raise £30,000 for water-works, but under £100,000 for gas-works also, and other matters which were included. I imagined that £70,000 would represent the value of the gas-works. After we left the House of Lords the chairman of the gas company offered our mayor shares at £16 10s. We were taken by surprise at the company coming to Parliament this year. If we had refused to deal with them, or refused to borrow money necessary for mains extension, it would have been quite time enough for them to come to Parliament, but as long as we had this power in our Borough Act we thought it was almost a breach of faith. I was one of a deputation to the company to negotiate about the supply to the public lamps. That was on the 4th or 5th of August last year. Before the passing of our Act we proposed to take the gas for one year at 3s. 9d. The company declined to supply us at that rate unless we went in for a lengthened period, the same as other people. They stated the reason they made the large discount was that we must bind ourselves for five years, for we are restricted by our Act from contracting for more than three years, and they said, "Then it must be three years." There are, perhaps, five or six private gas-works in St. Helen's. In consequence of the company's excessive price, the London and Manchester Plate Glass Works formerly made their own gas, but when the price was reduced they took that of the gas company. I maintain that if gas were made so cheaply that all the large consumers took it equally with the small ones, it would be advantageous for the whole district. The company complain of the consumption being small, but they drive trade away from them.

Re-examined by Mr. RODWELL: By making reduction I believe they will still get their statutory dividend.

Mr. MUNDELL then addressed the committee in reply. He said that his learned friend had argued that when the corporation got the power to buy, as they did under the 84th section of their Act, it put the company in the position of never being able to come to Parliament, of increasing their capital or district, or of being able to add to their power in any way, because they were under an engagement to sell themselves to the corporation at some time or other, which might be any time or no time. The 84th section, which was the empowering clause, also stated that the provisions relating to the purchase of the water company should apply, *mutatis mutandis*, to the purchase of the gas company. Clause 76 showed the mistake into which his learned friend had fallen. In terms it applied only to the water company, but by inference it applied also to the gas company. It said that the corporation might, after the vesting of the water undertaking in them, exercise all the rights, powers, &c., vested in the water company immediately before such transfer. The word "rights" meant that they would get all the rights possessed by the company at the time of transfer, whether those rights were increase of capital or money borrowed, which would be a liability *per contra* for the right to go to Haydock. The corporation would obtain that; they would actually work under the company's Acts, and it would be as though their names were in the St. Helen's Act of Parliament, *mutatis mutandis*, instead of being the St. Helen's Gas Company. His friend's attention had not been directed to the 75th clause, therefore he put an interpretation on the Act which would not hold water for a moment. He (Mr. Mundell) would dare to say that the case was not quite rightly argued before the Vice-Chancellor. If he might judge from what fell from him, they could obtain it if they had money enough to buy. They must do certain things in a certain order first. Mr. Evans stated that they were to lay out £30,000 for the water company, and it was his (Mr. Mundell's) opinion that the other £70,000 would not suffice for them to pay for anything like the value of the gas-works, even if the company were inclined to sell, which they were not; therefore, why that should be put forward as a grievance, when the company were only entitled to it if they pleased, he would leave the committee to deal with. It had no bearing on the case whether the company should extend their limits or not. It might be their mistake, as his learned friend knew, that in completing the amount they had to pay the company they had not sufficient money. That was a matter purely ancillary to the main question, and he would now come to the question whether the company were entitled to go to Haydock, Sutton, and Ashton, or not. It did not at all follow, because limits were given to a company, that they were to go unless they went there at a profit. He started with that, because his opponent seemed to suppose that the company would do those things most to their interest. It could never be to their interest to go to an outlying place and spend capital where they would get no return. Just as they had abstained from going into the spot marked pink on the plan, because of no population existing there to yield a profit, so they would abstain from going to Haydock, Ashton, and Mackerfield unless they were to be commercially remunerative. They had not done things which were wrong before, and they had not done them with a view to swell the dividends, because they had got the sum with no reserve at all, but they had got to do this in respect of bygone dividends to the extent of £5300, therefore they had never attempted to swell the dividends to 10 per cent., but had managed their affairs with *bona fides*, though not, perhaps, wisely. But he challenged his learned friend to point out one single item where there had been extravagance or bad management that had caused an increased price in the production, and thereby to the consumer. With regard to Haydock, that place could not be supplied from Newton at all except surreptitiously and in violation of the Act of Parliament. There was no population upon the verge of Newton and Haydock which would make it worth their while, for the population of 3000 which extended to Messrs. Evans's works were in the immediate neighbourhood of the St. Helen's district. The boundary of the corporation at Haydock was coterminous with the boundary of the larger area. They had asked the St. Helen's Company to go within 400 yards of the boundary of Haydock, and they had gone there for the public convenience at a price that would be barely remunerative at the mains. There was a dangerous bridge, which was at present included in the company's limits, which was at first included in the first scheme of the corporation; but finding it would cost so much more for a few lamps up to it, they cut short the lamps a few yards further—the dangerous bridge was to remain unlighted to save a few trumpery pence per year for a few ratepayers in St. Helen's. Were the company to be stopped from going to this ideal boundary by the Corporation of St. Helen's, who looked at their own interest in the most miserable manner? Were there to be 2½ miles of road without public lamps in a public neighbourhood, and were they not to go there because it might not pay commercially, and because the company were to put a price upon it? What price? Mr. Hawksley said it might be a difference of 1d. per 1000 feet against the price of gas supplied to others, which was so mean a thing as not to be worth arguing about, and he would only remark that it was not within the distance where the company ought to charge a differential rate. It was actually nearer to go into the extremest point of Haydock than into some parts of their own district, and how in fairness could they ask Haydock to pay a differential rate? There was no such interval such as at Warrington, and if it was worth the Warrington Company's while to go for 7½, it was worth the St. Helen's Company's while to go there and get 10 per cent. With regard to the capital, £24,000 was the sum asked for. He had produced evidence to show that the works would require £30,000 in about seven years; but the company would have so much more money to work upon if they issued by share capital instead of by selling the shares at a public auction. They would have to come back to Parliament in the face of the opposition of the corporation, who, if not kept at a distance, and who, if any tricks were played upon them such as imputed to the company by Mr. Evans, would come and oppose the company at a ruinous expense. They would have the control of the company here, and would oppose them with the public funds; therefore the company must be on their best behaviour. It was unfair to impute anything of that kind to the company, for in the past the corporation were never able to show that the company had done anything unhandsome. With regard to the 4s. price, it was wholly insufficient. The fact of it being in the bill was not binding. Those clauses were put in by Lord Redesdale without inquiry. His learned friend had said that the corporation could not charge any more if they bought the company; but the fact was, if their price did not pay, they could make it up by a rate in aid, and then the people of St. Helen's would have to pay whatever it might cost. The company was entitled to have some margin, but they had none; for although it was plain that at the present consumption they would only be entitled to get a dividend of £7 10s., in consequence of the increased price, if they were enabled to reduce the leakage, they might, by increased consumption, be able to get a better dividend by-and-by. Therefore the two things were quite consistent. The company did pay 10 per cent., because they did not allow the larger discount, but in selling a larger amount of gas they would only be able to pay 10 per cent.; but his learned friend now said the 4s. price was inadvertently arrived at. Comparing it with Wigan, the Wigan price actually charged was 3s. 6d. The price of the difference of the 6 per cent. leakage would be 2½d., bringing it up to 3s. 8½d. They were entitled to charge their full 4s. 2d. The St. Helen's Company only charged on the average 4s. 3d. At Wigan they paid all their dividends, and had a £10,000 reserve-fund. Their financial condition had an important bearing upon the consideration price. The St. Helen's had no reserve-fund, and no depreciation account, although they ought to have had it; they had neither surplus nor could they pay their dividend, and the other side said that, although the actual difference of depreciation would be only 2½d., that ought to be cut down to the actual price for gas supplied at Wigan.

Mr. RODWELL: I do not say that 4s. 2d. is not the actual price charged at Wigan.

Mr. MUNDELL said it was 4s. 2d., but adding for difference of depreciation it would be 4s. 4½d., if the St. Helen's were to be cut down to the price the Wigan actually charged. If they were to be cut down to the price to the smallest consumer, it would be 3s. 2d., and to the largest consumer 2s. 10d.; but they were not to take into account the discount, but to charge the actual sum charged at Wigan, and if that were done it would leave £2 10s. or £3 dividend upon the original share capital. At Wigan they could never have done it unless they had paid their original dividend to their shareholders, and so got a large balance to put by. Parliament had provided a check for undue charges; the St. Helen's had never been in the happy position to avail themselves of it. If they charged too much under their maximum of 4s. 6d., so that they were enabled to pay their 10 per cent. dividend, the surplus would go to form a reserve-fund as at Wigan, and when that fund amounted to a quarter of the capital, the evidence was that they would be obliged rateably to reduced their price of gas. Why should they be put in that position? By the maximum price in the bill they could never have a reserve-fund. As to the analogy with Wigan, the learned counsel went on to contend that no likeness had been made out except in one thing. The works there were far more expensive in construction, they had paid enormous bonuses which the St. Helen's had not paid, their dividend was less, and they made gas there for 1s. 4d. or 1s. 7d. less than at St. Helen's. The other side endeavoured to put in on the price of coal. That was only one element—it was the quality of generating gas which the coal possessed that was the main element. There was the cost of collection, the leakage of mains, and an infinity of smaller matters connected with the price to be looked to; and he contended the other side had established no analogy between the present case and that of either Wigan or Warrington. In conclusion, he thought he had put it before the committee clearly that the company were entitled to retain the 4s. 6d. Mr. Hawksley said they could not have it both in quality and price. It was immaterial, as they must continue to supply the same gas as heretofore. He (the learned counsel) had been dealing upon the assumption that the company supplied 18 candles at the works, which was the 16 candles named in the bill, and he had shown that they ought to have upon the Warrington comparison 4s. 6d. in the bill, and upon the Wigan account the company ought to put upon the scale of 4s. 2d., *plus* 2½d., which was 4s. 4½d.; and having no margin upon the price they ought to be entitled to put in 4s. 6d. There were never two things alike. All these comparisons were false, and it was not worth while to argue this little comparison between Wigan and Prescot and those small places. He thought the committee would be of opinion that the preamble was proved, and he trusted they would allow the company to go into Haydock, Ashton (where there was a population which could be equally well supplied with the same pipe), and Mackerfield.

The committee-room was cleared, and on the parties being called in,

The CHAIRMAN said: The committee have decided that the preamble is proved. In their opinion the capital is right. The company ought to be permitted to go into Ashton-in-Mackerfield and Haydock, but the price they think ought to be reduced to 4s. in the borough of St. Helen's, and 4s. 6d. in the outlying districts. Those are the heads of the decision to which the committee have come.

Mr. MUNDELL said he received the decision of the committee, but as regards

third parties it put the company in a very unpleasant position. They had come to an agreement to supply them at the same price as any one else, and he would like to see whether under the circumstances the Haydock people would allow them to reconsider that point; therefore if they were allowed to adjourn the clauses it would do them a great favour.

Sir JOHN DUCKWORTH said the committee had taken the question of differential price into consideration. The question would be what Haydock ought to be satisfied with; if they got what was fair, why should they not agree as far as they were themselves concerned.

Mr. MUNDELL said he was much obliged for the argument. Of course, they were not aggrieved in the sense that inasmuch as they would get it at 4s. 6d.

TUESDAY, JUNE 28.

Mr. NORTON said he represented parties who were seriously affected by the amendments now proposed to be introduced. They petitioned in the House of Lords, and the bill was settled by arrangement with the promoters in a manner satisfactory to them, and consequently they did not appear on that petition. They had not petitioned in this House, not being apprehensive of any alteration that would be prejudicial to their interests; but hearing of the proposed amendments, they came forward last evening for the purpose of getting a petition prepared and deposited to-day, but the gentleman whom they intended to get to sign it was not to be found in time, and consequently they were not formally before the committee. The question, however, was one of great importance to them, and they desired very earnestly to be heard upon it; and if the committee, by granting them a day's delay, could accede to their request, it would enable them to prepare a petition.

Mr. MUNDELL said he did not at all object to the committee hearing, without a petition, all that could be said as to Haydock, and he was quite sure they could do it if they liked.

After a short discussion the chairman decided that they could not be heard and the clauses were then proceeded with.

On clause 2, "The borrowing of money by the company on mortgage or bond, and the consolidation of shares into stock,"

Mr. THOMAS objected to it, as it would enable the company to convert their borrowed money into stock.

Mr. MUNDELL: We do not want to do that.

Mr. THOMAS: Then there is an end to the matter.

Clause 4 was postponed, at the request of Mr. Mundell, until after the passing of clause 19.

On clause 11,

Mr. THOMAS said by that clause the additional shares were to be sold by public auction, and what he wanted was that they should be sold by public auction so as to command the premium they would command as paid-up shares. He suggested that after the words, "sold by public auction," the words, "as fully paid-up shares," be inserted.

Mr. MUNDELL objected, as this question was not in the petition.

The CHAIRMAN ruled that the learned counsel ought not to be heard.

Upon clause 19, "Price of gas,"

Mr. MUNDELL said he wanted to understand the meaning of the decision of the committee. The words were taken out permissively; they were the same in the St. Helen's Improvement Act, 1869, and the result was that the company could charge 4s. 6d. without the borough if they chose, but they need not charge it unless they liked. If that was the meaning of the committee, then he thought this expressed it—if they meant that the company must charge 4s. 6d. out of the borough.

Sir J. DUCKWORTH: No, not at all; our meaning was that those should be the maximum prices.

Mr. COATES then read clause 4, which recites that the company may supply gas to Ashton-in-Mackerfield and Haydock, and that they may exercise the same powers as they could have exercised if such extended limits had been included within the limits of the recited Act—"Provided that the company shall not erect any works for the manufacture or storeage of gas within such extended limits; and that the company shall, with respect to the supply of gas to the township of Haydock, be under the same duties and obligations as they are under with respect to the supply of gas at St. Helen's."

Mr. MUNDELL suggested that the clause should stand as it was printed, with nothing struck out, "and shall not charge any higher price for such supply in the said township than they are at the same time charging for a like supply in St. Helen's," with the introduction of the words read by Mr. Coates. The company could not keep faith with the Haydock people if those words were struck out, and that was why he wanted to come to the 19th clause. They had made an agreement with the Haydock people, and the committee had said that they were not to be compelled, in going beyond the borough, to charge 4s. 6d., but were to be at liberty to charge less if they pleased.

The CHAIRMAN: That is the feeling of the committee.

Mr. THOMAS said the real question was whether the committee were willing to put upon the face of this bill, and to validate a contract otherwise invalid between the promoters of the bill and one particular part of an outlying district, which was after all in the same position as the other extra-municipal parts of the district, that they would allow a special contract to be put on the face of this bill, notwithstanding the price of 4s. 6d. for all the out-districts, and that this bill should bind the promoters to supply Haydock and Ashton at the same price as in the borough. Surely that was inconsistent with the committee's decision, which he understood to be that the promoters were to be allowed to charge one price within certain limits, and another price without, and that there was no exception. Let them leave it at 4s. within and 4s. 6d. without on the ordinary footing, and not by this bill validate any contract for the benefit of one particular district as against the others.

Mr. MUNDELL said the company were to be under the same duties and obligations as they were to be under at St. Helen's. He thought the committee would allow (more particularly in the absence of Haydock, and the risk there was of the bill being recommitted) that clause to stand part of the bill.

After some further argument on both sides, the committee deliberated.

The CHAIRMAN: The words in question, "and shall not charge any higher price for such supply in the said township than they are at the same time charging for a like supply in St. Helen's," are to be struck out, and the other words after the word "company," in line 32, "shall not erect any works for the manufacture or storeage of gas within such extended limits, and that the company," shall be introduced.

Mr. THOMAS: You leave in the twelve months obligation?

Mr. MUNDELL: Yes.

Mr. THOMAS: That puts them in an exceptional position.

Sir J. DUCKWORTH: It will not do you any harm after all.

The clauses were then proceeded with.

On clause 22, "quality of gas,"

Mr. THOMAS said he had given his learned friend clauses as to continuous testing but in the interest of conciliation, and considering that, after all, the committee had put the illuminating power at only 14 candles, he hardly thought it necessary to press the point, and would allow the testing clauses to go as they were.

Upon clause 28,

Mr. THOMAS said this clause seemed a little invidious.

Mr. MUNDELL said he must ask the committee to limit his learned friend to going into matters only that were mentioned in his petition. There was something about remuneration of directors, but there was nothing in it about this.

Mr. THOMAS admitted it was not specifically mentioned.

Upon clause 4B, "As to discount,"

Mr. THOMAS proposed to add a clause to the effect that the company shall allow 10 per cent. to consumers within the borough of 150,000 feet, and who pay their accounts within 30 days of their being rendered.

Mr. MUNDELL said his learned friend did not say that there ought to be any discount, but having settled the question of price irrespective, he said, "I will come for a further reduction of price," never having mentioned the question of discount in his petition, and he would ask the committee whether they would allow him to do that. He cross-examined irrespective of all this, and then his learned friend wanted to have a different discount.

Mr. THOMAS said it was quite clear that either the company intended to continue their old practice, or as had been the case in some of the City companies notoriously, on lowering the price the discount was to be given up. He thought it was clear that if it had been to their interest to allow discount for a series of years for all accounts above 150,000 feet, it could not be contrary to their interests to apply it for the future; and if so, it was most desirable that it should be put in the bill, in the same way as in the Wigan Act of 1861. If the corporation were not to have their discount, the effect to them would be an increase in price, being 4s. as against 3s. 9d.

Mr. MUNDELL said he was entitled to be heard on this point, and he would call Mr. Hawksley if the committee would allow him.

Thomas Hawksley, Esq., examined by Mr. MUNDELL.

It is contrary to fact, and is not consistent with my experience, that Parliament is in the habit of placing a discount clause in gas bills. There are some exceptional instances in which discounts, or a graduated scale rather than discounts has been adopted. There is no analogy between the South Shields and Tynemouth cases and this. Last year the cost of gas delivered at the meter was 3s. The price charged was 5s. net, and the dividend came to 2s. Then the effect has been this, that first, out of the dividend, 6d., which is 25 per cent., was taken off in the House of Lords; another 6d., being another 25 per cent., has been taken off in the House of Commons, and the present application is to take off $4\frac{8}{10}$d.—nearly 5d., so that the difference of 2s. will become reduced to $7\frac{3}{10}$d. if this application receive the committees' favour. It is another way of arriving at 3s. 6d., and the company could not live at this. Seeing that the corporation have a power to buy, and that the purchase-money is to be taken with reference to the profit, the effect of it would be that the corporation would get these works, if they are ever sold to them, at a price very much below their real value. I am much against making these great reductions to the large consumers, for it operates in this way—the reduction comes wholly out of the margin left for dividend; it is not 10 per cent. upon the profit, which might be somewhat reasonable, but it is 10 per cent. upon the gross price; it is 10 per cent. upon the cost of manufacture as well as 10 per cent. on the profit. No doubt it pays the large consumer at the cost of the small one.

Cross-examined by Mr. THOMAS: Parliament fixes a maximum price, and then if the company can afford to charge particular classes of large consumers somewhat less, it is for them in their discretion to say what less. The real intention of this is for the corporation to get public lights supplied at an unduly low price. The public lights ought to be charged really higher than any other lights, for each public lamp is a separate private consumer, having a separate service-pipe and a separate leakage to every one of the lamps. I am aware there is a contract for three years, and then it will be in the power of the company, unless this clause passes, to raise it to 4s., or to reduce the price to small consumers, but if they are compelled to supply the public lamps at an unduly low price, the loss must be cast ultimately upon the small consumers. I know that the public are better supplied by companies than by corporations.

Mr. MUNDELL said he thought this a very invidious matter, and he would ask the committee to dismiss this attempt to reduce the profits of the company.

Mr. THOMAS trusted that the committee would be of opinion that there should be this gentle pressure on the company. They were going away with their full powers, having had 10 per cent., and a prosperous career before them. He trusted they would enact this rule for the future, which had been their rule for the last 13 years, in the belief that they would reap a better return for their enterprise and capital.

The CHAIRMAN: The committee are of opinion that they cannot accept this clause.

Mr. THOMAS then proposed to insert in clause 28A—the audit clause—words to the effect that, in addition to the audit of the accounts by persons appointed by the company under the Companies Clauses Act of 1845, the corporation shall appoint one person and the company another (unless both parties shall agree on one person, in which case the cost is to be divided), who shall audit the company's accounts for the year he is appointed and also the year preceding; provided that it shall not be necessary that such auditor be a shareholder in the undertaking. Under the Companies Clauses Consolidation Act the company's own auditor must be a shareholder. He suggested merely an auditor on both sides, but did not propose to give them any special powers; but the effect, in a town like St. Helen's, of having an auditor, would be that any irregularity in the opinion of that auditor would be noted in his report, and would become public by those means. They knew in practice that that check was a most effective one in preventing anything being done which might otherwise be done with reference to an undue appropriation of capital to the revenue account, or an undue dealing with shares, or with reference to the application of capital in an undue way. He did not mean to say that the effect of the clause would be necessarily to prevent these things being done, but if they were done they would be publicly known. (The learned counsel here quoted the Preston Gas Act of 1865, and the Brighton and Hove Act of 1866, as precedents.)

A MEMBER of the COMMITTEE: Was there permissive power to purchase on behalf of the corporation in the Brighton and Hove case?

Mr. MUNDELL said there was not. They got so much for dividend, and they agreed to an audit.

Mr. THOMAS said it seemed to him that the existence of a permissive power to purchase could not affect the question either way.

Mr. MUNDELL thought that this was a most invidious application. There had never been the smallest objection made as to the good state of the company's accounts, and during many years, as at present, the company had employed a professional accountant. Under 10 Vict., c. 15, they were bound under a penalty to produce all their books and vouchers upon a proper occasion; and under clause 38 of the same Act they were bound to send an account of their transactions to the sheriff-clerk each year, under a penalty of £20. What more publicity could be given? The corporation sought a distinct audit, in order that they might get behind the scenes to see how they could best get at the value of the company's property.

After some further discussion, and after the committee had deliberated,

The CHAIRMAN said: The committee are of opinion that clause 28A must be rejected.

Mr. THOMAS stated that he had to suggest very shortly the next three clauses. There was the question of making a map.

Sir J. DUCKWORTH observed that some notice ought to have been given of these things before; it was impossible to consider all these things at once.

Mr. THOMAS: They were handed to the opponents last Friday.

Mr. MUNDELL objected to the clauses, as not coming within the scope of the petition.

Mr. THOMAS said he would withdraw them.

The chairman was directed to report the bill, as amended, to the House.

Miscellaneous News.

THE EUROPEAN GAS COMPANY, LIMITED.

An Extraordinary General Meeting of Shareholders of this Company was held at the Office, 11, Austin Friars, on Wednesday, July 6, "to confirm the special resolutions passed at the meeting held on the 8th of June last"—W. WHITE, Esq., in the chair.

The SECRETARY (Mr. H. M'L. Backler) having read the notice convening the meeting and the resolutions passed on the 8th of June (which were reported at the time),

The CHAIRMAN moved, and Mr. W. T. FAWCETT seconded—"That the same be now confirmed," which was carried unanimously.

The Annual General Meeting was then held, and

The SECRETARY read the notice convening the meeting, and the following report of the directors:—

Your directors have the satisfaction to report that, although the growth of business during the past year was not important, a favourable result has been attained, as will be seen by the following particulars:—

Amiens.—Increase of lights, 1871. This station continues in full prosperity, and the effect produced on previous accounts by low prices of coke has now been more than covered. With a view to the probable further expansion of the consumption of gas here, your directors have availed themselves of such opportunities as have occurred to make arrangements for the purchase of property most convenient as regards the extensions it may be necessary or desirable to carry out in the company's interest. A new gasholder will be required next year, and plans and specifications are being prepared for the same.

Boulogne-sur-Mer.—Increase of lights, 1257. The statement of accounts is in accordance with expectations raised by the continued progress made here for several years past, and which appears likely to be maintained for the future. The question of compulsory removal of works alluded to in the last report remains unsettled, and your directors will leave no steps untried to bring the matter to a satisfactory conclusion.

Caen.—Increase of lights, 684. A great portion of the improvement at this station is attributable to reduced cost of coals, but the use of gas is spreading here as elsewhere, and the prospects appear very promising.

Havre and Ste. Adresse.—Increase of lights, 1530. It should be remembered that the earnings of the preceding year showed a large increase, attributable in great part to passing prosperity occasioned by the International Maritime Exhibition, and, as the falling off now reported does not much exceed one-third of the addition then realized, the evidence of a healthy growing business must be considered favourable, more especially as some open accounts between the company and the municipality—arising out of different interpretations of the concession—were finally adjusted during the past year, and the sum payable by the company (having thus for the first time been clearly ascertained) was brought into account as a charge on the profits. Several lots of land adjoining the works were put up for sale by auction in the early part of the year, and secured for the company on reasonable terms.

Nantes and Suburban Districts.—Increase of lights, 108. Your directors regret that the apparent improvement at this station when the last half-yearly meeting was held has not been confirmed by subsequent returns. In this position of affairs they feel reluctant to make any encouraging remarks, but the most earnest endeavours are being used to reduce expenditure; so that, whilst local trade remains stagnant, such stringent economy may be enforced in every department as to prevent the returns suffering to a greater extent. With this view a purchase of land contiguous to the works has been affected, to provide storeage for coals close to the retorts, instead of at a considerable distance, as was formerly the case. Some additional profit will be derived from the distillation of ammoniacal liquor now being carried on here.

Rouen, Sotteville, and Suburban Districts.—Increase of lights, 474. Notwithstanding a reduction of gas-rental, it is pleasing to observe a small increase of profit, which reflects credit on the intelligent management of the local superintendent, and, although many cotton factories are still being worked at short time, and the operation of several others has been temporarily suspended, your directors are far from taking a despondent view of the state of business here, which they feel confident will make rapid progress whenever the general trade of the country shall revive.

Summary.—Total increase of lights during the year, 5934.

Several circumstances occurred to counterbalance the advantage arising out of the additional quantity of gas sold in the aggregate at the six stations, and of the lower terms on which the provision of coals was secured; thus wages were generally higher, and a great reduction took place in the value of coke. These, combined with various other causes, tended to modify the result, which would otherwise have exhibited a much larger addition to the earnings.

It is gratifying to be able to state that contracts for coals for the present year's supply have been arranged at a reduction on the terms previously paid, whilst shipping to convey them has also been chartered in several instances on more favourable conditions, and the price of coke shows a decided tendency to increase.

The charge for interest on debentures is £78 less than in 1868-9, owing to the financial operation reported to the last half-yearly meeting, and the amount of debentures has since been further reduced by the sum of £2400, which became due on 1st inst., and was paid off out of the resources of the company.

Your directors recommend the payment of a dividend at the rate of 10 per cent. per annum, together with a bonus of 2 per cent. After providing for this, a balance will remain of £1798 19s. 9d. to be added to the general revenue account or reserve of undivided profits.

The death of Mr. F. Ladbroke having occurred since the last annual meeting, at which he was re-elected to the office of auditor, your directors have, in conformity with clause 96 of the company's regulations, appointed Mr. George Harrison to fill the vacancy.

He is eligible for election by the shareholders on the present occasion, and offers himself accordingly, together with Mr. William Jones Lewis, the senior auditor.

The directors who retire by rotation are Messrs. Thomas Chaloner Smith and William White. Both will be proposed for re-election.

The CHAIRMAN: In moving the adoption of the report, I have but little to say. Nantes is the only station which appears to require particular notice. The position of affairs there is not satisfactory, owing to various causes. The trade of the city has suffered much, and the consumption of gas also has been affected. We have found some difficulty in collecting the amounts due to the company, and the working capital on the 31st of March therefore appears large; but I am happy to say that this condition of things is now improving, and that we are gradually returning to our usual state of regularity. I hope we have seen the worst, and, if so, we cannot be far from re-entering on a course of prosperity. Rouen has not made progress, but in the present state of the cotton trade that is not surprising. I visited that station with the secretary only a short time ago, and I can testify to the bad effect produced on our interests by the suspension or closing of many cotton factories, on the activity in which, as you are aware, our business here is mainly dependent. However, our net earnings exceed those of the previous year, and after all that is the main point. All the other stations are doing well, and if the profit at Havre is not so large as last year, it is owing to special circumstances sufficiently explained in the report. You will, therefore, see that it cannot be considered as a retrograde step from the onward course which this, the best of our stations, has continuously maintained. The severity of the past winter has enabled us to dispose readily of our coke at all but the unfortunate Nantes station, and as, with that exception, we have no stocks, we are naturally looking for better prices, and have some reason to believe that they will be obtained. You may, perhaps, be aware that gas coals generally are increasing in value, but we have been successful in making some contracts for the present year on terms even more advantageous than those of last year, and I think we are entitled to claim credit for having done so well in face of a rising market. The future of the company appears to me exceedingly promising, and the increase of business imminent. We feel obliged, therefore, in common prudence, to provide for the extensions that will become indispensable sooner or later, and with this view we avail ourselves of every opportunity that occurs to purchase land contiguous to our different works. By managing this judiciously we have generally succeeded on very favourable terms, and we have, in several cases, arranged such conditions of payment as to enable us to defer the actual outlay of cash until the property can be brought into profitable operation. This we will endeavour to achieve as soon as possible, and I can assure you that we let nothing escape us which is likely to develop our business, and thereby increase our prosperity. I stated at the last annual meeting that the profits then earned were more than sufficient to pay 12 per cent., owing to exceptionally favourable circumstances, but as we had only recently raised the dividend and bonus to 11 per cent., it appeared prudent to wait the result of further experience before making another advance; now, however, that we have done still better, not only without extraneous aid, but whilst labouring under several special disadvantages, it is clear that we may safely declare a 10 per cent. dividend and 2 per cent. bonus, particularly as we can do so after providing fully for every contingency, and then leave a balance of about £1700 to be added to the general fund of undivided profits. I have only one matter more to mention, that is the death of Mr. Ladbroke, who had been one of the auditors of the company from its commencement. This event occurring as it did between two meetings, obliged us to nominate a successor, and we selected a gentleman well qualified for the office—himself a considerable shareholder, and representing moreover a very large interest in the company. I shall be happy to answer any questions that may be put to me, and I will conclude by moving—"That the report now read be received and adopted."

Mr. W. T. FAWCETT seconded the motion.

Mr. T. HUGGINS: At the half-yearly meeting in February you stated that we were under obligation to remove the works at Boulogne, and that if we should not be successful in resisting the requirements of the authorities in this respect, a call of £2 10s. would have to be made on the new shares to meet the expense. Has that matter been settled?

The CHAIRMAN: I am quite certain I did not make such a statement, which would have been contrary to the intentions of the board.

Mr. HUGGINS: I saw it in print this very morning in the JOURNAL OF GAS LIGHTING, to which I have referred.

The SECRETARY having read extracts from the report of the meeting in the JOURNAL OF GAS LIGHTING, it appeared that the chairman had stated that the board would justly be considered much to blame if, on the occurrence of such an event as the removal of the Boulogne works, they were to make a call of £2 10s. on the shareholders to meet the expense, but so far from that, they had made full provision for such a contingency out of the past profits of the company, so that the future earnings could not be affected by the circumstance if it occurred.

Mr. HUGGINS said that he had minutely examined the accounts laid before the meeting, and obtained every information he required respecting them from the secretary, and he must say that the position of the company appeared to him more satisfactory than at any previous period, having regard to the increase of profits after every contingency had been fully provided for, the addition to the depreciation and redemption fund being, in fact, more than sufficient for the purpose, whilst debentures had been paid off to the amount of nearly £6000 out of the general funds of the company. He was much pleased with the report just read, and if every shareholder did as he had done, and called at the office to inform himself fully on the affairs of the company, he was quite sure that all would be as satisfied as he was.

The CHAIRMAN said he was glad to be in a position to invite the shareholders to do so, and the more they investigated the accounts the better the directors would be pleased.

Mr. BADDELEY said he never had the slightest doubt of the stability of the company or the accuracy of their accounts, but it was certainly most satisfactory to him to hear such an expression of opinion as that of the last speaker. It was clear that the operations of the company were conducted most creditably, and if, whilst the price of coals and the cost of freight were rising, the company had been successful in doing not only as well but better than last year, it must be admitted that they had managed their affairs remarkably well. If they succeeded in raising the price of coke this very hot weather, they would perform a greater feat still. At all events, he considered the future of the company as most promising, and the estimate he had formed of it had induced him to increase his holding in the undertaking.

The motion was then put, and carried unanimously.

The CHAIRMAN then moved, and Mr. W. T. FAWCETT seconded—"That a dividend at the rate of 10 per cent. per annum be declared on the old and new shares, and the first moiety thereof having been paid on the 1st of February last, that the second moiety be paid on the 1st of August, together with a bonus of 4s. per share on the old shares, and 2s. per share on the new shares, the whole out of interest and profits, and free of income-tax."

The motion was carried unanimously.

The CHAIRMAN moved, and Mr. T. N. STOKES seconded—"That Thomas Chaloner Smith, Esq., be re-elected a director of the company," which was carried unanimously.

Mr. T. CHALONER SMITH returned thanks, and said that his father, one of the original proprietors, and he after him, had held the shares he owned during 35 years, and had kept them through evil and good report without selling a single one of them. His confidence in the prospects of the company was founded on an intimate knowledge of its affairs and position.

Mr. FAWCETT moved the re-election of Mr. White, and said they could not have a better man to succeed their late chairman. Mr. White devoted himself heart and soul to the interests of the company.

Mr. CROWDEN seconded the motion, which was carried unanimously.

The CHAIRMAN, in returning thanks, said that he had been a director of the company 22 years; he had done his very best to make it prosper, and he was proud to think that his efforts had not been unavailing. He had every reason to expect that it would continue to go on progressing as it had hitherto done.

Mr. BADDELEY moved, and Mr. CROWDEN seconded—"That Mr. W. J. Lewis be re-elected an auditor of the company," which was carried unanimously.

The CHAIRMAN moved, and Mr. FREEMAN seconded—"That Mr. G. Harrison be elected an auditor of the company, which was carried unanimously.

Mr. HUGGINS said he was very happy to take the opportunity of moving—"That the thanks of the meeting be presented to the chairman and directors, as a mark of continued approbation of their able management of the company's affairs."

The motion having been seconded by Mr. SOLOMONS, and carried unanimously,

The CHAIRMAN said it was very pleasant, after arduous work, to enjoy the fruits of labour. Their attention to the company's business had been close and unremitting. He could but repeat that the same amount of care they had given to it for the past would be continued in the future for the benefit of all concerned.

The CHAIRMAN said he particularly wished the shareholders to present a vote of thanks to the secretary. He had no doubt every shareholder present would be ready to propose it, but he thought it would come better from him as chairman, having greater experience of the value of Mr. Backler's services than any other proprietor. He had recently visited all the stations with him, and could truly say that he devoted himself with the most entire earnestness and energy to promote the company's interest, not only in matters of importance, but in every little detail. Everything was thoroughly looked into by him, and he evidently was anxious not only to inform the board fully on all matters that came under his notice, but to lay all the accounts before them in such a clear and concise manner as to show them at a glance the real position of affairs.

The motion having been seconded by Mr. A. F. OSLER, was carried unanimously.

Mr. BACKLER returned thanks, and said he felt great satisfaction in hearing his services mentioned in terms of such high commendation by those best able to appreciate them. He had worked with a will for the company during 20 years, and, thanks to the ability with which he had been seconded by the staff here and abroad, he might say that during that time the course of the undertaking had been one of uninterrupted prosperity, the landmarks of which were to be found in an occasional increase of dividend, such as that on which he was able to congratulate the meeting that day. He could not agree with those who had stated at former meetings that there would be a serious evil in raising the dividends of the

company above 10 per cent. That was the maximum dividend allowed to London companies, if not to all English ones, but the circumstances were altogether different. They (the European Company) were under different laws and customs; they were working in a country where the rate of interest on investments was admitted to be higher, as might be seen by the Government funds, compared with those of England. Why should they be tied down to 10 per cent. if they honestly earned more, when one gas company abroad were paying 40, and another continental company had paid 18—the Paris Company having recently paid 24 per cent.? It would be placing themselves at a disadvantage compared with other similar undertakings. He considered their prosperity as very moderate at present, and such as might be and ought to be improved. He would do all in his power to bring that to pass.

The proceedings then terminated.

DR. FRANKLAND'S ANALYSIS OF THE METROPOLITAN WATERS IN JUNE, 1870.—"Royal College of Chemistry, June 25, 1870.—Sir, I have the honour to submit to you in the following table the results of the chemical examination of the waters supplied to the metropolis during the month of June. For the purpose of comparison, I append also the results yielded by the waters supplied to Birmingham, Manchester, Reading, and Leamington, and by Thames water taken at Battersea Bridge at low and high water on the 1st of March. All the waters delivered in London were clear and transparent when drawn from the companies mains. Dr. Hill reports to the Mayor and Corporation of Birmingham that the water delivered in that town, though tolerably clear, contained fine suspended particles. By being submitted to the late Dr. Clark's very simple process of softening, the total solid impurity in the Grand Junction Company's water was reduced from 24 to 9¼ parts in 100,000, and the hardness from 18·8 parts to 3·8 parts in 100,000. By long standing in storage reservoirs the East London Company's water had nearly lost all evidence of previous sewage or animal contamination. Of the waters drawn from the Thames those delivered by the West Middlesex and Grand Junction Companies contained the smallest proportion of organic elements. This is doubtless due, in a great measure, to the very thorough filtration practised by these companies. By filtration through a great thickness of chalk a still more thorough oxidation and destruction of the organic matters in water is effected, and consequently the proportion of organic elements contained in the deep chalk well water delivered by the Kent Company is still smaller.

Companies.	Date and Place of Collection.	Temperature in Centigrade Degrees.	Total Solid Impurity.	Organic Carbon.	Organic Nitrogen.	Ammonia.	Nitrogen, as Nitrates and Nitrites.	Total combined Nitrogen.	Previous Sewage or Animal Contam. (Estimated).	Chlorine.	Total Hardness.
Thames.											
Chelsea.....	June 1—Cab Rk., Horse Guards.	16·1	23·76	·156	·021	·000	·123	·144	910	1·68	18·34
W. Middlesex.*	June 1—Cab Rk., Portland Road.	17·2	23·64	·128	·019	·000	·125	·144	930	1·65	18·60
	June 16—Cab Rk., Portland Road.	20·8	23·60	·128	·025	·000	·107	·132	750	1·62	17·43
Southwark & Vauxhall..	June 1—Cab Rk., St. George's Ch.	16·4	23·68	·164	·021	·000	·109	·130	770	1·65	18·08
Grand Junction.....	June 1—Cab Rk., Woodstock St..	16·1	23·98	·144	·018	·000	·123	·141	910	1·65	18·84
Do., softened by Clark's process....	June 19—14, Lancaster. Gt., Hyde Park.....	..	9·26	..	..	..	..	..	..	..	3·80
Lambeth....	June 1—Cab Rk., Lambeth Road.	15·8	25·20	·163	·024	·000	·132	·156	1000	1·65	20·40
Other Sources											
New River..	June 1—Cab Rk., Totnhm. Ct. Rd.	17·2	21·98	·083	·023	·000	·108	·131	760	1·53	17·82
East London.	June 2—Slater's, Old Ford Road.	17·2	22·38	·113	·026	·000	·047	·073	150	1·75	16·52
Kent.....	June 2—Deptford Bdge. Police Sta.	13·6	38·96	·027	·017	·000	·410	·427	3783	2·35	28·32
Thames water, filtered..	Mar. 1, 1870—Battersea Br., mid-str., at low wat.	..	30·64	·451	·060	·024	·493	·573	4810	1·75	25·85
	At high water	..	32·20	·476	·048	·075	·364	·469	3940	2·05	25·02
Birmingham†	June 4, 1870—Bir. Wr. Sup.	..	18·96	·262	·039	·002	·214	·255	1843	1·77	13·28
Manchester..	Jan. 29, 1870—Man. Wr. Sup.	..	5·74	·070	·007	·001	·000	·008	0	·80	2·48
Reading.....	March 18, 1870—Read. Wr. Sup.	..	25·90	·205	·017	·001	·137	·155	1060	1·25	22·84
Leamington.	May 12, 1870—Leam. Wr. Sup.	..	68·92	·180	·035	·000	·191	·226	1590	2·30	27·50
	May 12, 1870—Mr. Jones' well wr.	..	134·04	·095	·025	·000	6·086	6·111	60540	14·20	63·95

* In my report for May, the water analyzed before and after filtration through animal charcoal was by mistake assigned to the West Middlesex instead of the Grand Junction Company. I have therefore analyzed two samples of the West Middlesex Company's water during the present month, in order that the annual series of 12 may be complete.

† Analyzed by Dr. Alfred Hill, of Sydenham College, Birmingham.

"The Registrar-General, &c." "E. FRANKLAND.

DR. WHITMORE'S REPORT ON THE QUALITY OF THE GAS SUPPLIED IN ST. MARYLEBONE, IN JUNE, 1870:—

June, 1870.	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quantity of Sulphur in 100 Cub. Ft.	Mean Quantity of Ammonia in 100 Cub. Ft.	Sulphuretted Hydrogen.
	*Mean of 21 Obser.	Highest.	Lowest.	Highest.	Lowest.	Grains.	Grains.	
Imperial Company's gas . . .	16·43	17·28	15·21	25·61	10·16	28·52	2·27	None.
Chartered Company's common gas	16·21	17·23	15·29	34·76	15·55	28·93	0·99	None.
Chartered Company's cannel gas	22·87	23·57	22·15	27·48	14·40	26·64	0·98	None.

Mean of daily readings of Barometer . . . 29·84
" " " Thermometer . . 69·77

* Each observation consists of 10 readings of the photometer, at intervals of one minute.

The mean illuminating power of the Imperial Company's gas, during the month, was equal to the light of about 16¼ sperm candles, and ranged from 17¼ to 15¼ candles; on ten occasions it exceeded 16 candles, and on five, 17 candles. The mean quantity of sulphur found in 100 cubic feet was 28½ grains, and of ammonia 2¼ grains. The common gas of the Chartered Company gave a mean light equal to nearly 16¼ candles, and ranged between 17¼ and 15¼; the amount of sulphur in 100 cubic feet was nearly 29 grains, while of ammonia there was barely 1 grain. The mean light of the cannel gas was equal to nearly 23 candles, and ranged from 23¼ to 22 candles; the mean quantity of sulphur found in this gas amounted to 26½ grains, whilst of ammonia there was less than 1 grain. The pressure of all the gases was uniformly good. The above results were obtained from the gas manufactured by the Imperial Company, at their Fulham works, and from the Chartered Company's gas manufactured at their works, Horseferry Road, Westminster.

DR. WHITMORE'S REPORT ON THE QUALITY OF THE WATER SUPPLIED IN ST. MARYLEBONE, IN JUNE, 1870:—

June, 1870.	Total Solid Matter in degrees or grains per Imperial gallon.		* Loss by Incineration of Solid Matter in previous column.		Ammonia.
	June, 1869. 0°	June, 1870. 0°	June, 1869. 0°	June, 1870. 0°	0°
Distilled Water . . .					
West Middlesex water .	17·20	16·24	0·56	0·72	—
Grand Junction water .	17·36	16·24	0·60	0·60	—

* The loss by incineration represents the amount of organic and other volatile matters contained in an Imperial gallon (70,000 grains) of water.

QUALITY OF THE GAS SUPPLIED TO THE METROPOLIS.—Dr. Letheby, the chief gas examiner for the metropolis, has recently reported to the corporation and to the Metropolitan Board of Works, on the quality of the gas supplied to the metropolis by the Chartered, the Great Central, and the City of London Gas Companies. The average illuminating power of the gas, when burnt at the rate of 5 cubic feet per hour, from Sugg's improved Argand burner, has been as follows:—The common gas of the City Company has been equal to 17·55 standard sperm candles; that of the Chartered Company, at Leadenhall Street, has been 17·44 candles, at Gray's Inn Lane, 16·92 candles, at Arundel Street, Haymarket, 17·14 candles; and that of the Great Central Company, 17·82 candles. The illuminating power of the cannel gas of the Chartered Company has been 24·44 candles, and of the City Company, 28 candles. As regards impurity, Dr. Letheby reports that the gas of all the companies has been constantly free from sulphuretted hydrogen, although the amount of sulphur, in other forms than the last named, has varied considerably; for while it amounted to an average of only 12·29 grains per 100 cubic feet of the Great Central gas, and 12·71 grains per 100 feet of the cannel gas from the City works, it reached to 22·13 grains, 22·39 grains, and 29·65 grains in the gas of the Chartered Company at the three testing-stations of Leadenhall Street, Gray's Inn Lane, and Arundel Street. In connexion with this important part of the subject, Dr. Letheby reports that the testings of the gas of the several companies for sulphur, during the last twelve months, has shown how this obnoxious impurity may be influenced by different methods of purification; for in the case of common gas, the average proportion of sulphur in the gas from the Great Central works has only been 12·91 grains per 100 cubic feet, whereas in the gas of the Chartered Company it has ranged from 21·41 to 28·59 grains per 100 cubic feet—the average for all the stations of that company being 24·77 grains, and of the City Company, 19·75 grains. And again, although the average amount of sulphur in the cannel gas of the City Company has been but 10·29 grains per 100 cubic feet, it has reached to an average of 24·48 grains in that of the Chartered Company. These large differences are, according to Dr. Letheby, entirely owing to the different methods of purification, and he directs attention to it as a matter of great practical importance. The other impurity, ammonia, has been always absent from the common and the cannel gas of the City Company, but it has been frequently present in the gas of the other companies, averaging 0·38 of a grain per 100 cubic feet of the Great Central gas, and from 1·87 to 3·68 grains in that of the gas from the different stations of the Chartered Company; in fact, it has exceeded the prescribed amount of 5 grains per 100 cubic feet on seven occasions in the Chartered gas at Leadenhall Street, and on nine occasions in the same company's gas at Gray's Inn Lane.

THE SEWAGE LITIGATION AT MERTHYR TYDFIL.—Mr. Bailey Denton, C.E., of Whitehall Place, has been appointed by the Lord Justice of Appeal in Chancery to report on the existing sewage works at Merthyr Tydfil, and on the best means of abating the nuisance complained of.

THE MAIN DRAINAGE OF DUBLIN.—A deputation from the Dublin Corporation, consisting of the Lord Mayor, Alderman Carroll, Mr. Norwood, and Sir John Gray, M.P., have had an interview with the Lord Lieutenant, in London, regarding the scheme for purifying the river Liffey. They seek a loan of £300,000. The success of their application depends on Mr. Lowe.

REDUCTIONS IN THE PRICE OF GAS.—The Crystal Palace District Gas Company have given notice that from and after Michaelmas, 1870, the price of their gas will be reduced from 4s. 6d. to 4s. 4d. per 1000 feet; and the Western Gas Company have also given notice that the price of their gas (cannel) will be reduced from 5s. 6d. to 5s. per 1000 feet. The Oxford Gas Company and the Hereford Gas Company have already reduced their prices from 4s. to 3s. 6d. per 1000 feet.

PRESENTATION TO MR. C. COPLAND.—An interesting ceremony took place on Saturday, July 2, at the station of the British Gaslight Company at Hull. It was the presentation of a testimonial by the clerks and *employés* of the company to Charles Copland, jun., Esq., C.E., on his retirement from the company's service. The testimonial consisted of an elegant silver inkstand from the establishment of Mr. Jacobs, and was presented with an address, on behalf of the *employés*, by Mr. T. Gorwood, chief clerk. Mr. Copland has had charge of the company's station at Hull over seventeen years, and during that time has earned for himself not only the esteem of those under his charge, but also the good opinion of the public at large. After Mr. Copland had feelingly replied to the address, he invited the whole of the *employés* of the company to luncheon. Upwards of one hundred sat down to an excellent repast, and appeared to thoroughly enjoy themselves. The usual loyal and patriotic toasts were proposed and duly honoured; the "Continued Prosperity of the British Gaslight Company" followed, and was drunk with great *éclat*.

THE METROPOLITAN SEWAGE QUESTION.—Sir John Thwaites and about 20 members of the Metropolitan Board of Works, with Mr. Keates, their consulting chemist, paid an official visit to the Leamington Sewage Works, on Saturday, the 9th inst., for the purpose of inspecting the "A. B. C." system of treating town sewage. Sir John and the deputation were conducted through the sewage works by Messrs. Sillar, the resident directors of the Native Guano Company, and were accompanied by Mr. S. Urwick Jones, the chairman of the Leamington Local Board. The mode in which the "A. B. C." compound—animal charcoal, clay, and blood—is mixed with the sewage was explained, the effect which it has on the suspended matter in the sewage exhibited, and samples of the effluent water as it flowed into the river, after passing through subsiding canals and a large sand and charcoal filter, were shown to the deputation. Specimens of the native

guano extracted from the sewage were also exhibited, and particulars were given of its fertilizing effects when applied to different crops. Messrs. Sillar, in reply to a question from Sir John Thwaites, on behalf of the Native Guano Company, stated that they should be happy to allow an experienced chemist to have the supervision of the works for a fixed period, so as to thoroughly test the system on behalf of the board. Sir John intimated that in all probability this offer to subject their system and works to an independent and rigorous test would be accepted by the board at an early date.

STATE OF THE WATER IN REGENT'S PARK.—The following letter has been sent to the Chief Commissioner of Works:—"Court House, July 8, 1870.—Sir, I am directed by the vestry of St. Marylebone to bring to your notice the present unsatisfactory state of the water in the Regent's Park lake. I may, in the first place, be permitted to state that at the time when the cleansing and levelling of the bed of the lake was in progress, a deputation, consisting of Dr. Letheby, Mr. Humphreys (coroner for Middlesex), myself, and some others, waited upon the then Chief Commissioner of Works, Lord John Manners, to request that he would increase the depth of water in the lake during the summer months from 4 feet, as proposed, to 5 feet. This request was made on sanitary grounds alone, which at the time were fully explained to his lordship, and to which he ultimately acceded. On my inspection of the lake yesterday afternoon, I went over every part of it, and nowhere could I find a greater depth of water than 4 feet—in many places the depth did not exceed 3 feet 6 inches. Towards the eastern part, near the York Gate Bridge, the water was foul, and smelt offensive, but on the east side of this bridge, near the extremity of the lake, the water was filthy and offensive in the highest degree. A dark fœtid scum was floating on the surface, and bubbles filled with foul air were continually rising, showing that vegetable decomposition was rapidly going on at the bottom. The condition of the lake at this spot was, I have no hesitation in saying, very injurious to health. At the southern end the water was also foul and offensive to the smell, but less so than at the eastern end; in other parts of the lake the water was tolerably clear, and I could not perceive any offensive effluvium arising from it. A remedy for improving the condition of this water suggests itself to me, and I could not perceive any offensive effluvium arising from it. A remedy for improving the condition of this water suggests itself to me, and I trust I may be excused in offering it for your consideration. In the first place, the depth of the water should be increased to 5 feet, as agreed to by Lord John Manners. Next, that two outlets should be made at the eastern extremity—one level with the surface, and one at the bottom of the lake—from which the foul water could be allowed to run off as often as required; by the former, the fœtid scum, dead leaves, and other floating matter, would be got rid of; and by the latter, accumulations of mud and other filth. The same thing should be done at the southern end. I would further propose that the bottom of the lake should be cleansed from weeds, &c., more frequently than at present, and that in the hot weather a portion of water, say to the depth of 1 foot, should be drawn off from the lake at intervals of not more than a month, to be replaced with fresh water from the company's mains. In conclusion, I would observe that complaints of the condition of the lake have frequently been made to me by residents in the park, one of whom states that he has prohibited his children going near it, from a conviction that it is injurious to their health.—I have, &c., J. WHITMORE, M.D., Medical Officer of Health, St. Marylebone.—To the Right Hon. A. S. Ayrton, Chief Commissioner of Works, &c., &c."

Register of New Patents.

APPLICATIONS FOR LETTERS PATENT.

1872.—THOMAS GRAY, of New Wandsworth, in the co. of Surrey, chemist, for "*Improvements in the manufacture or purification of gas.*" July 1, 1870.

1883.—GEORGE SCOTT, of 33, Church Street, Chelsea, and HENRY YOUNG, of Oakley House, Manor Street, Chelsea, both in the co. of Middlesex, for "*Improvements in means or apparatus for measuring the flow or passage of liquids, which improvements are also applicable to obtaining motive power.*" July 2, 1870.

1947.—THOMAS BRUCE, of Monkton, in the co. of Ayr, N.B., for "*Improvements in pumping or forcing apparatus for hydraulic presses, and for compressing or exhausting elastic fluids.*" July 9, 1870.

1949.—PETER SPENCE, of Newton Heath, Manchester, manufacturing chemist, for "*Improvements in the treatment of sewage, and in obtaining manures or fertilizing substances therefrom.*" July 9, 1870.

1952.—WILLIAM MARRIOTT, of Huddersfield, in the co. of York, for "*Improvements in the manufacture of iron salts or compounds, and in the purification of gas.*" July 9, 1870.

1967.—BRISTOW HUNT, of 1, Serle Street, Lincoln's Inn, in the co. of Middlesex, gentleman, for "*Improvements in the process of and apparatus for carburetting gases or atmospheric air, so as to render the same applicable for lighting, heating, or producing motive power.*" A communication. July 12, 1870.

1976.—WILLIAM COWLEY, of Liverpool, in the co. of Lancaster, for "*Improvements in the apparatus for pumping and forcing air and other fluids, and which apparatus is peculiarly applicable to desiccating, the ventilation of mines, buildings, ships, and other structures, and for blast and other purposes.*" July 13, 1870.

1980.—HENRY KESTERTON, of 9, Stratford Road, Birmingham, in the co. of Warwick, for "*Improvements in the manufacture of iron tubes, and in machinery employed therein, applicable also to the manufacture of tubes of other metals.*" July 13, 1870.

1988.—WILLIAM EDWARD NEWTON, of 66, Chancery Lane, in the co. of Middlesex, civil engineer, for "*Improvements in counting registers, applicable to counting the revolutions of shafts in various kinds of machinery, steam and other engine indicators, for registering stroke or travel, indicators for gas or water meters, clocks, adding machines, and registering devices of different kinds, or for various purposes.*" A communication. July 14, 1870.

GRANTS OF PROVISIONAL PROTECTION.

1664.—JAMES WILLIAM BUTLER, of Stonebridge Park, Willesden, in the co. of Middlesex, civil engineer, WILLIAM DAVID BUTLER, of Princes Street, Hanover Square, in the co. of Middlesex, civil engineer, and JAMES DUNBAR, of Vicarage Road, Camberwell, in the co. of Surrey, civil engineer, for "*Improvements in machinery or apparatus for supplying coal, cannel, or other substances to gas-retorts or ovens, and for withdrawing the same after distillation.*" June 9, 1870.

1713.—HENRY LAW, of 15, Essex Street, Strand, in the co. of Middlesex, civil engineer, for "*Improvements in apparatus for the supply of water to water-closets, urinals, lavatories, buildings, and streets, some of which improvements are applicable to other purposes.*" June 15, 1870.

1715.—ROBERT MILLER, of Gartcosh, in the co. of Lanark, N.B., for "*Improvements in the manufacture of clay or earthenware pipes, and in the mechanism employed therefor.*" June 15, 1870.

1729.—HENRY HERMANN KROMSCHROEDER, of 90, Camden Street, Camden Town, gas engineer, and WILLIAM PARMINGTER RANDALL, of 9, Dorset Street, Vauxhall Bridge Road, gas-meter maker, for "*Improvements in gas-meters.*" June 16, 1870.

1872.—THOMAS GRAY, of New Wandsworth, in the co. of Surrey, chemist, for "*Improvements in the manufacture or purification of gas.*" July 1, 1870.

Share List of Metropolitan Gas Companies.

Number of Shares issued.	Amount per Share.	Name of Company.	Amount paid up p. Share.	Dividend p. Cent. p. Annum.	Latest Quotations.
	£		£ s. d.	£ s. d.	£
8000	10	Anglo-Romano	10 0 0	10 0 0	11 — 12
5000	20	Bahia (Limited)	20 0 0	3 0 0	13 — 14
1000	20	Do., preference	20 0 0	10 0 0	25 — 27
750	20	Do., do., redeemable	20 0 0	10 0 0	20 — 22
40000	5	Bombay (Limited)	5 0 0	4 10 0	6¼ — 6¾
10000	5	Do., third issue	4 0 0	4 10 0	4¾ — 5¼
10000	20	British (Limited) (Norwich, Hull-Sculcoates, Hanley, Tunstall & Shelton [Potteries], Trowbridge, & Holywell.)	20 0 0	10 0 0	30 — 31
7500	20	Cagliari (Limited)	20 0 0	7 0 0	
112000	10	*Chartered*, A shares	10 0 0	8 0 0	12¼ — 13
8000	10	Do., do.	5 0 0	8 0 0	6¼ — 6¾
10000	10	Do., B shares, 4 per cent. max.	10 0 0	4 0 0	6¾ — 7
25000	10	Do., 5 per cent. preference	2 0 0	5 0 0	3 — 3¼
10000	20	*City of London*, A shares	20 0 0	9 0 0	24 — 26
10000	10	Do., B shares	10 0 0	4 0 0	6¾ — 7
9629	10	Do., new shares	10 0 0	9 0 0	12¼ — 13
17490	25	*Commercial*	25 0 0	10 0 0	41 — 42
20000	20	Continental Union	20 0 0	8 0 0	27¼ — 28
10000	10	Do., new	5 0 0	..	9 — 9¼
5213	20	Do., preference	20 0 0	7 0 0	25 — 26
5000	10	*Crystal Palace District*	10 0 0	10 0 0	16 — 16¼
5000	10	Do., preference	10 0 0	6 0 0	11 — 11¼
10000	10	Do., new shares	10 0 0	7 0 0	12 — 12¾
4000	50	*Equitable*	50 0 0	10 0 0	82 — 84
4000	25	Do., new shares	25 0 0	10 0 0	41 — 42
23406	10	European (Limited)	10 0 0	11 0 0	18 — 18½
12000	10	Do., new shares (Boulogne, Amiens, Rouen, Caen, Havre, & Nantes.)	5 0 0	11 0 0	10 — 10½
20000	10	*Great Central Gas Consumers*	10 0 0	..	19 — 20
5000	10	Hong Kong (Limited)	10 0 0	7 0 0	11 — 12
26000	50	*Imperial*	50 0 0	10 0 0	84 — 85
26000	10	Do., new shares	7 0 0	10 0 0	12¼ — 13
26000	12½	Do., new shares	12 10 0	7 0 0	15 — 15¼
1300	100	Do., bonds	£100	10 0 0	175 — 180
56000	50	*Imperial Continental* (Amsterdam, Berlin, Ghent, Hanover, Lille, Rotterdam, Aix-la-Chapelle, Antwerp, Bordeaux, Brussels, Cologne, Frankfort-on-Maine, Haarlem, Stolberg, Toulouse, & Vienna.)	43 15 0	9 2 6	67 — 68
400	100	Imperial Mexican (Limited)	100 0 0	nil.	
200	100	Do., new	100 0 0	nil.	
3000	40	*Independent*	40 0 0	10 0 0	64 — 65
3000	10	Do.	10 0 0	5 0 0	7 — 9
3000	20	Do.	15 0 0	7 10 0	17 — 18
7133	50	*London*	50 0 0	10 0 0	82 — 84
5610	25	Do., 1st preference	25 0 0	6 0 0	28 — 30
503	50	Do., 2nd preference	50 0 0	6 0 0	
214	50	Do., 3rd preference	50 0 0	6 0 0	
£18781		Do., 1st preference stock		6 0 0	
£11828		Do., 2nd preference stock		5 0 0	
		Nictheroy, Brazil (Limited)			
15000	5	Malta and Mediterranean (Limited)	5 0 0	4 10 0	3¾ — 4
6000	5	Do., preference	5 0 0	7 0 0	4¾ — 5¼
30000	5	Oriental (Calcutta)	5 0 0	10 0 0	8 — 8¼
30000	5	Do., new shares	1 10 0	10 0 0	3 — 3¼
10000	5	Ottoman (Limited)	5 0 0	nil.	2 — 2¼
14000	10	Pará (Limited)	10 0 0	10 0 0	10 — 11
27000	20	*Phœnix*	20 0 0	10 0 0	32½ — 33
3600	100	Do., new	40 0 0	7 10 0	45 — 46
144000	8k.	Do.	100 0 0	5 0 0	83 — 86
5000	20	*Ratcliff*	20 0 0	10 0 0	27 — 28
	20	Rio de Janeiro (Limited)	20 0 0	10 0 0	28¼ — 29
6959	5	Singapore (Limited)	5 0 0	5 0 0	
2000	5	Do., preference	5 0 0	7 10 0	
1500	32½	Shanghai	32 10 0	12 0 0	
4000	50	*South Metropolitan*	50 0 0	10 0 0	85 — 87
4000	12½	Do.	12 10 0	10 0 0	20 — 22
20000	12½	Do., new shares	1 0 0	10 0 0	3¾ — 4¼
15000	10	*Surrey Consumers*	10 0 0	10 0 0	16 — 16¾
10000	10	Do., new	6 0 0	10 0 0	10 — 10¾
9000	4	United General (Limerick)	4 0 0	5 0 0	2¼ — 2¾
1500	10	*Wandsworth and Putney*	10 0 0	10 0 0	10 — 12
1500	10	Do.	10 0 0	7 10 0	
1819	10	Do.	10 0 0	7 10 0	
1138	10	Do.	5 0 0	7 10 0	
20000	10	Western (Limited) A shares	10 0 0	10 0 0	17 — 17¼
10000	10	Do., B shares	8 0 0	10 0 0	14¼ — 15
10000	10	Do., C shares	8 0 0	10 0 0	13 — 13¾
20000	10	Do., D shares	1 0 0	10 0 0	2¾ — 3
16000	5	*West Ham*	5 0 0	7 10 0	7 — 7¼
551	10	West London Junction (Limited)	10 0 0	6 0 0	
520	10	Do., preference	10 0 0	6 0 0	

THE

DUKE OF HAMILTON'S

LESMAHAGOW

CANNEL COAL.

LESSEES:

THE NITSHILL & LESMAHAGOW COAL COMPANY.

OFFICE:

37, ST. VINCENT PLACE,

GLASGOW,

Where all communications are requested to be addressed.

NOTICES TO PROCEED.

525.—GEORGE LEECH, of Goat Lane, in the city of Norwich, in the co. of Norfolk, gas-fitter and bell-hanger, for "*Improvements in the manufacture of stocks for screwing and cutting iron pipes, bolts, and other similar uses.*" Feb. 23, 1870.

596.—MARMADUKE WILKIN, of 2, St. James's Terrace, Paddington, in the co. of Middlesex, gentleman, JOHN CLARK, of 8, Belmont Terrace, Kensington, in the co. of Middlesex, engineer, and ADAM SCOTT, of 3, Blomfield Crescent, Paddington, in the co. of Middlesex, gentleman, for "*Improvements in subdividing particles of water and other fluids, and applying the same to sanitary and other purposes.*" March 1, 1870.

608.—THOMAS BROWN, of the firm of Thomas Brown and Co., of 96, Newgate Street, in the City of London, civil engineer, for "*An improved apparatus for feeding or supplying steam-generators with water, which said apparatus is applicable to the raising and forcing of water and other liquids.*" A communication. March 2, 1870.

673.—WILLIAM EDWARD NEWTON, of 66, Chancery Lane, in the co. of Middlesex, civil engineer, for "*Improved apparatus for injecting and reducing liquids to a state of spray or a minute subdivision.*" A communication. March 7, 1870.

689.—GEORGE PRESTON and JOHN PRESTIGE, both of Deptford, in the co. of Kent, engineers, for "*An improved apparatus for preventing waste of water in dwellings and other places where the constant supply service is laid on.*" March 8, 1870.

842.—WILLIAM HENRY CLEMESHA and THOMAS ROBERTS, of the city of Manchester, in the co. of Lancaster, for "*Improvements in self-cleansing high-pressure filters for the purification of water.*" March 22, 1870.

1403.—JAMES YATES, of Birmingham, in the co. of Warwick, manufacturer, for "*Improvements in taps or stop-cocks.*" May 16, 1870.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

1860.—WILLIAM EDWARD NEWTON, "*Improvements in filtering apparatus.*" June 26, 1867.

1931.—JOHN SOMERVILLE and ROBERT ELSDON, "*Improvements in the treatment of apparatus employed in the manufacture and materials used in the purification of gas.*" July 3, 1867.

1967.—WILLIAM ROBERT LAKE, "*Improvements in the manufacture of illuminating gas, and in a paratus employed in the said manufacture.*" July 4, 1867.

1986.—JOHN CLARKSON MAJOR, "*Improvements in furnaces for the production of heat by burning tar, petroleum, and other liquid combustibles, and in the mode of conducting the burning of the said combustibles.*" July 6, 1867.

2004.—JOHN JAMES BUCKLEY and CHARLES HOOK, "*Improvements in the manufacture of gas, and in apparatus connected therewith.*" July 9, 1867.

Advertisements.

FLETCHER, SPECK, & CO.,

CONTRACTING GAS ENGINEERS, IRON & BRASS FOUNDERS,

GLENGALL IRON-WORKS, MILLWALL, LONDON, E., and **RATCLIFF FOUNDRY, COMMERCIAL ROAD EAST, LONDON, E.,**

MANUFACTURERS OF

TELESCOPIC and **SINGLE GASHOLDERS, TANKS, PURIFIERS, CONDENSERS,** and every description of **GAS-MAKING APPARATUS. IRON MAIN-PIPES** supplied and laid. **RETORTS, MOUTHPIECES, RETORT-LIDS, VALVES,** and **FITTINGS.** Wrought and Cast Iron Hydraulic Mains. **LAMP-POSTS, COLUMNS, GIRDERS, BRIDGES,** &c.

CORRUGATED IRON ROOFS & BUILDINGS.

GENERAL GAS CASTINGS PROMPTLY EXECUTED.

WANTED, by a Dutchman, aged 22, who thoroughly understands the manufacture of Coal Gas, and has been five years in a Gas-Work in Holland, a situation as CLERK or ASSISTANT MANAGER. Can use the photometer. Highest testimonials. Knows French, German, and English. No objection to go abroad.

Address M. H., Post-Office, CROYDON.

WANTED, an intelligent Man, who is thoroughly competent to take charge of private Gas-Works on a gentleman's estate; who can make gas, keep the works in repair, lay mains, do fitting, smith's work, and some plumbing; who is willing also to make himself generally useful. A single man will be preferred, for whom a room would be provided, but no attendance.

Apply, stating terms and giving testimonials, to Mr. GEORGE WILLIAMS, 14, Hackin's Hey, LIVERPOOL.

WANTED, by the Hereford Gas Company, a sober, steady Man, capable of laying mains and services, and of doing the ordinary smith's work and fitting required on the works. Wages 24s. per week.

Application to be made to Mr. WILLIAM DAVIS, Manager, HEREFORD.

WANTED, by a married Man, a situation as WORKING FOREMAN over Fitting Department, or as WORKING MANAGER of Gas-Works. Satisfactory reference.

Apply by letter to A. Z., care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by the Folkestone Gas and Coke Company, a young Man thoroughly competent to undertake the Inspection and Repair of Meters.

Applications, stating wages required, and accompanied by references or copies of testimonials, to be addressed to Mr. W. MEDHURST, Jun., the Secretary of the Company, Gas-Works, FOLKESTONE, on or before the 29th inst.

CARBONATE Ammonia Apparatus for SALE, consisting of four 12-ft. Iron D-Retorts, with furnace and fittings complete; four Circular Leaden Condensers, 3 ft. by 5 ft., with fittings complete; 2 Drying-beds, each 6 ft. by 4 ft., &c.

Subliming Bath, of ¼-in. wrought-iron, with 12 cast-iron pots and leaden baloons 2 ft. diameter, with fittings complete, and in good working order.

Also a Liquid Ammonia Apparatus, consisting of a large cast-iron Still, with agitator and fittings complete, a leaden Condenser of superior construction, and a set of five 20-gallon Wolff's Condensing Bottles, all in complete working order.

Applications for price, &c., to be made to Mr. SAMUEL DAY, 40, High Street, MAIDSTONE.

GAS AND WATER WORKS TO BE LET.

THE Milford Improvement Commis-sioners are prepared to receive TENDERS for LETTING, for a term of Five or Seven years, as shall be agreed upon, the MILFORD GAS AND WATER WORKS.

Particulars and further information may be obtained on application at the Office of the Commissioners, Milford, PEMBROKESHIRE.

Sealed tenders to be sent to the Clerk, on or before the 10th day of August.

The Commissioners do not bind themselves to accept the lowest or any tender.

By order of the Commissioners,
THOMAS EDMOND, Clerk.

WANTED, by the Mauritius Gas Com-pany, Limited, a competent Man to proceed to Port Louis as MANAGER. Age 25 to 35 years. He must be well acquainted with all matters connected with the manufacture, distribution, and purification of gas; also have a knowledge of gas-fitting and accounts.

Applications (stating full particulars as to past and present employment), with list of references, to be addressed to the SECRETARY, 39, Old Broad Street, LONDON.

TO GAS ENGINEERS AND MANAGERS OF GAS-WORKS.

WANTED, for a Youth 18 years of age, a SITUATION in an Engineer's Office, or in a Gas-Work where he would have an opportunity of acquiring a thorough knowledge of the profession. He has had four years practical experience in a provincial Gas-Work, and can produce first-class testimonials. Salary *not* a primary object.

Address A. B., 14, Catherine Street, HARTLEPOOL.

GAS Manager Wanted, for a small town in Italy. Must be experienced, have good references, and a knowledge of French or Italian.

Address, stating salary expected, No. 1, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

NORTHALLERTON, YORKSHIRE.

TO BE SOLD (pursuant to a Decree of the High Court of Chancery, made in a cause of "Malam *v.* Parker," with the approbation of the Master of the Rolls), by Mr. RICHARD MAYNE, the person appointed by the said Judge, at the Golden Lion Hotel, at Northallerton, in the county of York, on TUESDAY, Aug. 2, 1870, at Two for Three o'clock in the afternoon, in One Lot:—All those FREEHOLD PARCELS of LAND at Northallerton, formerly part of a close, called the Pinfold Close, containing in the whole 550 square yards, and all the gas-works or gas manufactory, buildings, erections, gasometers, retorts, condensers, purifiers, tanks, wells, reservoirs, machinery, and fixtures thereto belonging and erected thereon, used for the purpose of making coal gas; and also the main, service-pipes, and other apparatus communicating with the said gas-work and premises, and lying throughout the public streets and places of the said town of Northallerton, and all lamps, posts, pillars, and apparatus belonging to the said works, used in lighting the said streets and the dwelling-houses and places of the said town.

Particulars and conditions of sale may be had (gratis) of Messrs. BRIDGES, SAWTELL, HEYWOOD, and RAM, Solicitors, No. 23, Red Lion Square, London; and of Messrs. ROBINSON and SON, Solicitors, Beverley; of the AUCTIONEER, and at the said Hotel.

CONTRACT FOR GAS COAL.

THE Directors of the Newport, Isle of Wight, Gas Company are prepared to receive TENDERS for the supply of 2000 tons of the best GAS COAL, to be delivered between the 1st of September, 1870, and the 31st of August, 1871, at such periods and in such quantities as may be required, of which a month's previous notice will be given, and not more than 500 tons nor less than 300 tons will be required at one time. Payments in cash on delivery.

Sealed tenders, marked "Tender for Coal," are to be sent in to the MANAGER of the Gas-Works, Newport, ISLE OF WIGHT, on or before the 1st of August, and are to state the price, either f.o.b. in the Tyne or delivered in Cowes Harbour, also the quality of the Coal, and colliery from whence to be supplied.

The Directors do not bind themselves to accept the lowest or any tender.

TAR AND TAR-WORKS TO BE LET.

TO BE LET by Tender, for One, Three, or Five years, from the 1st of November next, the TAR-WORKS situate in Farington, near Preston, together with Tar produced at the various works belonging to the Preston Gas Company.

Tenders, endorsed "Tender for Tar, &c.," must be delivered to the undersigned, on or before Sept. 3 next.

For further particulars, apply to HENRY GREEN, Engineer.

BOROUGH OF SALFORD GAS COMMITTEE.

THE Gas Committee of the Borough of Salford is prepared to receive TENDERS, with samples, for 200 tons of OXIDE OF IRON for purifying purposes; 600 WOOD GRIDS for Purifiers, to pattern, are also required.

Particulars may be known on application to the MANAGER, at his Office, Gas-Works, Lamb Lane.

The Committee does not bind itself to accept the lowest or any tender.

Tenders to be delivered at the Gas-Works, Lamb Lane, and addressed to the Chairman of the Gas Committee, endorsed "Tender for Oxide" or "Wood Grids," on or before Saturday, the 23rd inst. By order.

Gas-Works, Lamb Lane, Salford, July 12, 1870.

THE Directors of the Edinburgh Gaslight Company having, as authorized by Act 3rd Victoria, cap. xiii., resolved to ISSUE and SELL to the Public by Private Sale 600 SHARES, of £25 each, of ADDITIONAL CAPITAL STOCK of the Company, to meet the cost of additional works executed and in progress, are prepared to receive Offers for the said Shares, in lots to suit purchasers, the whole price to be payable on Monday, the 15th day of August next.

Offers to be addressed to Mr. WATSON, Treasurer and Manager of the Company, and delivered at their Office on or before Saturday, July 30.

The Directors do not bind themselves to accept the highest or any offer.

Edinburgh Gaslight Company's Office,
25, Waterloo Place, July 4, 1870.

SWANSEA GASLIGHT COMPANY.

TO TAR DISTILLERS, MANUFACTURING CHEMISTS, & OTHERS.

THE Directors are prepared to receive offers from parties willing to TENDER for the purchase of the whole or portion of the surplus TAR produced at their works, for a period of Three or Five years.

Surplus quantity about 100,000 gallons per annum.

Tenders at per gallon (in the Gas Company's tanks) to be sent in to me, the undersigned, on or before the 6th day of August.

The Directors do not bind themselves to accept the lowest or any tender.

THORNTON ANDREWS, Secretary and Manager.
Swansea, July 16, 1870.

TO GASHOLDER MAKERS.

THE Directors of the Newport, Isle of Wight, Gas Company are prepared to receive TENDERS for the erection, at their works at Newport aforesaid, of a GASHOLDER, 66 ft. 6 in. in diameter by 22 ft. deep.

Plans and specification may be seen at the Company's Works, or a copy of the specification (price 2s. 6d.) will be forwarded on application to the Manager, from whom any further information may be obtained.

Sealed tenders, marked "Tender for Gasholder," to be sent in to the MANAGER not later than Saturday, July 23, 1870.

TO GAS ENGINEERS, SURVEYORS, & OTHERS.

A Premium of Twenty Guineas is offered by the Sheerness Local Board of Health for plans, to be approved and accepted by the Board, accompanied by specifications and estimates, for the construction of Buildings, Tank, Gasholder, Purifiers, Condensers, and other plant and requisites for Gas-Works, on the land of the Board, at West Minster, in the district of Sheerness, and for providing, laying, and fixing the necessary pipes, &c., in connexion therewith, for supplying the public lamps within the district, and for other purposes.

Further particulars may be obtained on application to Edward Mudd, Esq., Surveyor, at the Office of the Board, Trinity Road, Sheerness.

The competitor whose plans may be accepted and adopted by the Board will be required to supply working drawings, which, together with the original plans, specifications, and estimates, are to become the sole property of the Board on payment of the said premium.

The plans, &c., are to be delivered at this Office, on or before the 2nd day of August, 1870.

The Board will not bind themselves to accept any of the plans they may receive.—By order,

EDWARD FELKIN, Clerk.

Office of the Local Board of Health,
Trinity Road, Sheerness, Kent,
July 5, 1870.

TO COAL CONTRACTORS.

THE Kilkenny Gas Company, Limited, will, up to Friday, the 22nd day of July inst., receive TENDERS for the supply of about 1500 tons of best GAS COAL, delivered *ex* ship at Waterford Port, or free into their works at Kilkenny.

Tenders to be addressed to the Secretary, at the works.

By order,
JAMES GARGAN, Secretary.

Gas Office, Kilkenny, July 1, 1870.

FOR SALE, Two Purifiers, 3 ft. 6 in. square by 2 ft. 9 in. deep, with Clayton's six-way centre-valve.

Apply to CLAYTON, SON, AND CO., Gas Engineers and Contractors, Hunslet, LEEDS.

Now publishing,

BAILEY'S ILLUSTRATED INVENTIONS,

With Illuminated Cover and over 300 Engravings.
Price 1s.

This book is replete with information, and prices of many well-known as well as perfectly new inventions, interesting to all in the mechanical trades, as well as corporations, governments, gas managers, private gentlemen, and shopkeepers.

Post free in the United Kingdom, 1s.

JOHN BAILEY AND CO., Albion Works, Salford, LANCASHIRE.

TO GAS COMPANIES, ENGINEERS, BUILDERS, &c.

THE PATENT ANTI-GALVANIC PAINT

Is guaranteed to prevent and arrest Rust on all Ironwork, and to cover Tar most effectually. It is most valuable for protecting it from the action of salt water, rain, sulphurous and gaseous exhalations. It has been well tested at various Gas-Works, in covering Tar on Gasholders, Purifiers, &c., and has given great satisfaction.

Testimonials given if required, and sample cans for trial, sent free of charge,

All communications to be addressed to Messrs. STEVENS AND CO., 156, Cheapside, LONDON.

T. EVANS & SONS, Retort-Setters and GAS-OVEN BUILDERS, having done the work at various Gas-Works in England and Wales for many years, can be well recommended. Testimonials and references on application.

Communications to be addressed to the Gas-Works, Cannock, near STAFFORD.

THE BRITISH ASSOCIATION OF GAS MANAGERS at the Chartered Gas Company's Works, Beckton, June 9, 1870.

PHOTOGRAPHIC GROUPS of the above, well mounted for framing—size 15 inches by 12—may be had of F. R. WELLS, Photographer, Heath Street, BARKING, E. Price 3s. 6d. each.

Of the above Pictures, Magnus Ohren, Esq., President of the Association, writes: "I have examined photographs of members taken at Beckton Works, and find that there are 180 perfect likenesses."

The Hon. Sec., W. H. Bennett, Esq., also says: "Both are very excellent productions. I was much astonished to find that I could name the majority of the portraits, so accurately have they been rendered."

"The members of the British Association of Gas Managers will find an admirable souvenir of their visit to the Beckton Works in the excellent photographs of the assembled group, taken by Mr. F. R. Wells, of Heath Street, Barking."—*Journal of Gas Lighting.*

TENDERS FOR GAS COAL.

THE Directors of the Commercial Gas Company are prepared to receive TENDERS for the supply of 65,000 tons of the best GAS COAL, to be delivered into the Company's lighters in the Regent's Canal Basin, Limehouse, in as nearly as may be the following monthly quantities:—

August, 1870	8000 tons.
September, 1870	8000 "
October, 1870	8000 "
November, 1870	8000 "
December, 1870	8000 "
January, 1871	7500 "
February, 1871	5000 "
March, 1871	4000 "
April, 1871	3500 "
May, 1871	2500 "
June, 1871	2500 "

The Coal to be fresh wrought, dry, unscreened, as free as possible from pyrites, bats, bind, or other refuse, and to be weighed in accordance with the custom of the London Coal Meters Office.

Tenders to be addressed to the Secretary, endorsed "Tender for Coal," and to be delivered on or before the 21st day of July, 1870, at the Company's Offices.

The Directors do not bind themselves to accept the lowest or any tender.—By order of the Directors,

GEORGE JAQUES, Secretary.

Stepney, London, July 1, 1870.

TO GASHOLDER MAKERS.

THE Bradford-on-Avon Gas and Coke Company are open to receive TENDERS for the making and erection of a new GASHOLDER.

The dimension of the Tank they are making is 45 ft. in diameter by 20 ft. deep, to which they propose to erect a Telescopic Holder in two lifts, with five columns and girders, &c., the holder to be made of the best Staffordshire iron.

The tender to be accompanied by drawings and specifications of the form, size, and weight of the materials.

The Committee of Management do not bind themselves to accept the lowest or any tender.

Particulars may be known, and further information obtained, from the Chairman of the Company, to whom sealed tenders are to be addressed on or before the 20th day of July next.

Bradford-on-Avon, June 20, 1870.

SWANWICK CANNEL.

The yield of this Cannel is liberal, the illuminating power large, and coke good.

For prices and terms, apply to

H. BOAM, 1, Darwin Terrace, DERBY.

ROBERT MACLAREN and CO., EGLINTON FOUNDRY, GLASGOW, Manufacturers of all sizes of Cast-Iron Main-Pipes by an improved Patent, General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

BRONNER'S PATENT GAS-BURNERS give 99 per cent. of light, as compared with 37 per cent. given by ordinary burners, with equal consumption of gas.—*Vide* "Gas Referees Report," published June, 1869.

HENRY GREENE AND SON, Sole Consignees of Brönner's Patent Improvements in Gas Lighting, 16 and 17, King William Street, E.C., and 138, Regent Street, LONDON. Agents wanted.

JAMES NEWTON & SONS,
(Established 1820,)
FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
FALCON DOCK, 78 AND 79, BANKSIDE,
SOUTHWARK, LONDON, S.E.,
DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for
GAS AND WATER WORKS.

C. & W. WALKERS'
WOOD SIEVES FOR PURIFIERS.

These justly celebrated Sieves, with bevel bars and hard-wood side frames, have been extensively made by Messrs. Walker for over seven years, and their advantages and durability are fully established. Messrs. Walker make them in very large quantities, having mills and machinery specially laid out for them, producing them at the most moderate cost.

MIDLAND IRON-WORKS,
DONNINGTON, NEAR NEWPORT, SHROPSHIRE.
8, FINSBURY CIRCUS, LONDON, E.C.

ALFRED LASS,
ACCOUNTANT,
28, NORTH STREET, WANDSWORTH, S.W.

Mr. Alfred Lass having had considerable experience in arranging, making up, balancing and auditing gas accounts, begs to inform the Directors of Gas Companies that he may be consulted on all matters relating thereto.

Balance-sheets prepared, Accounts audited, Consultations, Agencies, &c.

SCOTCH CANNEL COALS.

The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

JAMES M'KELVIE,
CANNEL COAL MERCHANT,
HAYMARKET EDINBURGH.
Established 1840.

THOMAS BEAR,
MICA, TALC, AND ASBESTOS MERCHANT,
233, HIGH STREET, BOROUGH, LONDON.
MICA CUT TO ALL SIZES.

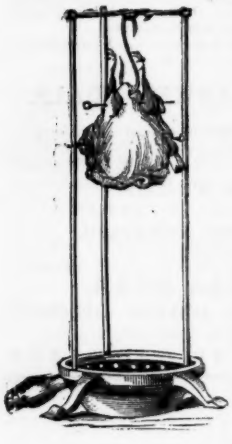
LIVESEY FIRE-CLAY WORKS,
NEAR BLACKBURN, LANCASHIRE.
ORLANDO BROTHERS,
MANUFACTURER OF PATENT CLAY RETORTS,
AND EVERY DESCRIPTION OF
TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.
FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

D. BRUCE PEEBLES & CO.,
ENGINEERS, WET AND DRY GAS-METER MANUFACTURERS,
BRASSFOUNDERS, & GAS APPARATUS MANUFACTURERS,
FOUNTAINBRIDGE WORKS, EDINBURGH.

SOLE MANUFACTURERS OF
Peebles' Patent Wet and Dry Gas-Meters in Tin-Plate Cases, with Tongue and Groove Joints.
IMPROVED WET METERS IN CAST-IRON CASES.
STATION-METERS, GOVERNORS, EXPERIMENTING METERS, PHOTOMETERS, PRESSURE-GAUGES, &c.

S. LEONI, ADAMAS WORKS, ST. PAUL STREET, NEW NORTH ROAD, LONDON, N.

One joint, one dish of potatoes roasted, and two pies baked in one hour, at the expense of one pennyworth of gas.



A joint of 6 lbs. roasted in 1 hour—consumption of gas 20 feet—cost one penny (at 4s. per 1000); 10 lbs., 1½ hour; 15 lbs., 2 hours.

Four quartern loaves of bread baked in one hour.
£5 5s. complete,
without flue.

FIRST-CLASS PRIZE MEDALS OF INTERNATIONAL EXHIBITIONS OF 1862 & 1867, & CORNWALL ROYAL POLYTECHNIC INSTITUTION, 1869.

Economizer. Scale 1-10th of full size.

Economizer. Scale 1-10th of full size.

Portable Atmospheric Gas Heating Stove.

China, with Coloured Designs

S. Leoni's Catalogue

Leoni's Patent Standard Gas Burner.

One Shilling each. Triangles for Globes 6d. each.

LEONI'S PATENT ATMOSPHERIC GAS COOKING STOVES,

(Broiling and Roasting by Reflection only), from 15*s.* each.

LEONI'S PATENT ATMOSPHERIC GAS HEATING STOVES,

For Halls, Conservatories, Counting Houses, Rooms, Churches, &c. (most economical, no flue required), from £1 16*s.* each.

Leoni's Patent Atmospheric Open Gas Fires,

(Cheerful, brilliant, and most effective) with asbestos or clinkers), from £1 1*s.* each.

LEONI'S PATENT ATMOSPHERIC GAS APPARATUS.

With self-heating hot-water circulating boiler for green-houses and all buildings, (require no atttention, and are very economical).

LEONI'S PATENT ATMOSPHERIC GAS APPARATUS,

(No flue required) with copper circulating water boiler, and 5 ft. 6 in. bath, (36 gallons of water raised to a temperature of 100° F. in ½ hour with less than a pennyworth of Gas and without any smell), from £10 10*s.* complete.

LEONIS PATENT ATMOSPHERIC GAS ROASTING & ALSO BAKING APPARATUS.

(In 1 hour's time with less than 1 pennyworth of Gas 6 lbs. of meat are well roasted, or 16 lbs. of bread baked, also one joint roasted, one dish of potatoes roasted, and 2 pies baked, all together in one hour), from £5 5*s.* each complete.

Leoni's Patent Gas Baking, & also Roasting Ovens,

Portable for stationary, or families, restaurants, hotels, clubs, hospitals, and establishments of the largest kind.

Leoni's Patent Atmospheric GAS RANGES,

Complete. Portable or stationary, for families, hotels, &c.

IMPROVED PATENT ADAMAS GAS BURNERS,

(Approved and highly commended by the official Gas Referees, *Vide* "Report," obtained Prize Medals in 1862 and 1867), from 1*d.* each.

LEONI'S IMPROVED PATENT ADAMAS TAPS

For Beer, Wine, Acid, &c., never corrode or leak, turn always easy and smooth, and are constantly clean and sweet, from 1*s.* 3*d.* each.

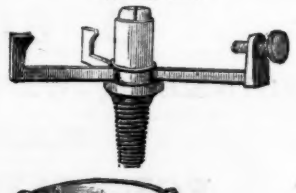
Chops and steaks, or two fowls, or a joint roasted on gridiron, and, at the same time, soles, &c., fried on top of the reflector.

Gas consumers, once aware of the advantages of cooking by Gas, will be glad to meet with efficient apparatus, **and Gas Companies have every interest to make such apparatus known.**

AGENTS WANTED IN EVERY TOWN.

LIBERAL TERMS.

PATENT STANDARD BURNER.
Scale ½ size.



1862.

PATENT ANTIMONY PAINT.

MADE ONLY BY

GEORGE HALLETT & CO.,

296, ROTHERHITHE, LONDON, S.E.

CLASS II.

1862 LONDINI HONORIS CAUSA

This Paint having been in general use over eight years (especially in some of the principal Gas-Works), and proved itself the best light-coloured Paint produced for resisting the influence of vitiated atmospheres, it is important that its qualities should be more widely known.

It is not discoloured like white lead in a sulphuretted atmosphere, nor washed off like white zinc; and its light colour reflecting heat, produces much less expansion of gas in holders painted with it than with dark colours, besides rendering them much more sightly. Its specific gravity is so much below white lead that the same weight will cover one-third more surface, while it is equal in body; and its price being about the same (30s. per cwt.), it is actually one-third cheaper. From experience, its manufacture is greatly improved, and it is quite suitable for all purposes in which white lead is employed.

Reference is kindly permitted by the Engineers of the City of London, Commercial, London, and Surrey Consumers Gas Companies, who pronounce it the best Paint known for their purposes.

N.B.—Antimony Paint, COVERING SO MUCH MORE WORK, costs about 20s. per cwt., as compared with White Lead at 30s. per cwt.; a similar economy arises from its use in Steam and Gas Joints, for which purpose it is superior to White Lead.

LAMBERT BROTHERS, WALSALL.

ALPHA TUBE & FITTING WORKS

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UNION STREET WEST, OLDHAM,

MANUFACTURER OF

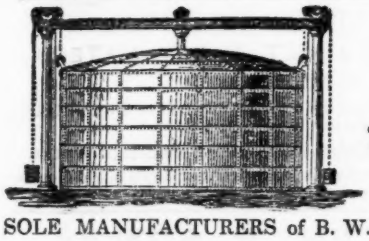
IMPROVED WET & DRY CONSUMERS GAS-METERS,

GAS STATION-METERS,

With all the Joints planed,

GOVERNORS, GAUGES, INDICATORS, EXHAUST GOVERNORS, &c.

TERMS, &c., ON APPLICATION.



IMPROVED GAS APPARATUS,

FOR CITIES, TOWNS, VILLAGES, &c.,

INVENTED AND MANUFACTURED BY

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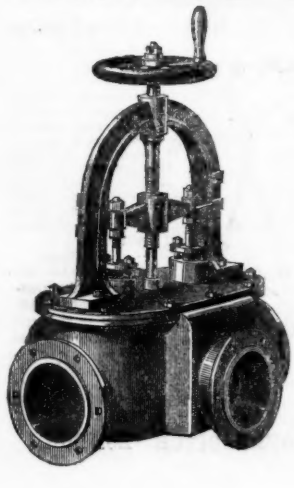
REFERENCES TO NEARLY 300 GAS-WORK

CATHELS & TERRACE'S

PATENT FOUR-WAY DISC GAS-VALVE



(Being a simplification and improvement of Cathels's well-known Valve) is the best Valve for Gas-Works. It is specially applicable as a by-pass to Condenser, Exhauster, Scrubber, Station-Meter, &c., as, having no springs, ground faces, or other delicate complications to be affected by crude gas, it NEVER SETS FAST. When applied to Purifiers, the utmost facility of change is afforded; the direction of the flow of the gas is seen at a glance, and no unpurified gas can pass into the holders at each change, as happens with Centre-Valves. In either application ONE VALVE SERVES AS THREE OTHER VALVES. The opening and closing are now effected by one movement, and the ports being all on the same level, enables the connexions to be simple lines of straight piping. The closing of one gas-way opens another, preventing the possibility of accidentally stopping back the gas. The Valve has been in general use for upwards of five years, with the most satisfactory results, and is so simple and strong that it may be considered indestructible.

Illustrated Circular, Prices, &c., on application to the Makers,

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FOUNDRY AND GENERAL BRASS-WORKS,

ROTHERHAM.

CANNEL COAL.—The West Yorkshire Iron and Coal Company, Limited, beg to draw the attention of Gas Companies to their Cannel, of which the following is the analysis made by W. Huggon, Esq., F.C.S.:

Yield of gas per ton . . . . 10,296 cubic feet.
Illuminating power rather over 21 sperm candles.
Yield of coke per ton . . . 12 cwt.

The actual working, as reported by one of the largest gas companies in Yorkshire, gives results still more favourable, viz.—

Yield of gas . . . . . 10,416 cubic feet.
Illuminating power . . . . . 21·89 sperm candles.
Coke . . . . . The same.

We add from the same source the capabilities of the common gas coal—

Yield of gas . . . . . 10,080 cubic feet.
Illuminating power . . . . . 14·41 sperm candles.
Yield of coke . . . . . 13 cwt.

COLLIERIES—WEST ARDSLEY, near LEEDS.

For further particulars, address to the Office of the Company, 15, York Place, LEEDS.

POPE & PEARSON'S GAS COAL.—We have now the authority of several of the most eminent Gas Engineers of London in stating that our Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles.*

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

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OLD WEMYSS CANNEL COAL.—Yield of gas per ton, 12,896 cubic feet; illuminating power, 31·75 standard candles. Port of shipment, Wemyss.

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CANNEL COAL.

MESSRS. GRIFFITHS BROTHERS,
COPPA COLLIERY, MOLD,

Beg leave to call the attention of Gas Companies to the superior quality of their Cannel for gas-making purposes.

This Cannel produces in actual working, in iron retorts, 9200 cubic feet of 32-candle gas, and upwards of 11 cwt. of coke, and in clay retorts will produce 11,500 cubic feet of 25·9-candle gas.

Ports of shipment—Birkenhead or Connah's Quay.

Waggons supplied for delivery by railway to any part of England or Wales.

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HUCKNALL COLLIERY COMPANY
Can offer a CANNEL COAL yielding a large quantity of Gas of superior quality.

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Manufacturers of all kinds of
GAS AND WATER PIPES,
Branches, Bends, Water-Traps, Tank-Plates, Valves, and general Castings. Also
RAILWAY CHAIRS & SLEEPERS,
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PIPES, VALVES, IRON ROOFS,
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WILLIAM FRASER, Inverkeithing (owner of the Works at which Fire-Clay Retorts were first made), having greatly enlarged his Works, can supply RETORTS and other FIRE-CLAY GOODS to any extent.

References can be given to managers of above a hundred Gas-Works whom he supplies.

WILLIAM FRASER ships COWDENBEATH PARROT COALS at Charlestown and Burntisland at 11s. per ton; and HALBEATH STEAM COALS, on Navy List, at 7s. per ton.

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CLASS X.
PRIZE MEDAL
For excellence of Fire-Clay Gas Retorts, and
"HONOURABLE MENTION" for good quality of Fire-Bricks.
WILLIAM STEPHENSON & SONS,
THROCKLEY,
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GAS ENGINEERS,
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Of any extent at Home and Abroad,
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SOLE MANUFACTURER OF
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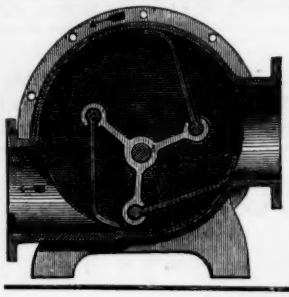
For ensuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.



CHARLES HORSLEY'S
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GAS EXHAUSTER.
(From 250 Feet upwards per Hour.)
Also,
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R. D. recommends his Fire-Brick Retorts to Engineers and Managers of Gas Companies; they last from 10 to 12 years.

Iron and Fire-Clay Retorts.
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Also, EVERY DESCRIPTION OF GAS APPARATUS,
Comprising GASHOLDERS, STATION-METERS, GOVERNORS, CONDENSERS, PURIFIERS, RETORTS, SLIDE-VALVES, and every article appertaining to Gas-Works.
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OF EVERY DESCRIPTION.
WORKS: LONDON, BIRMINGHAM, & PARIS.
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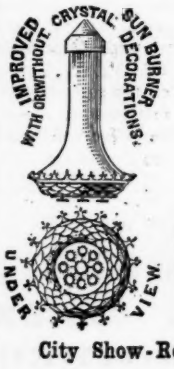

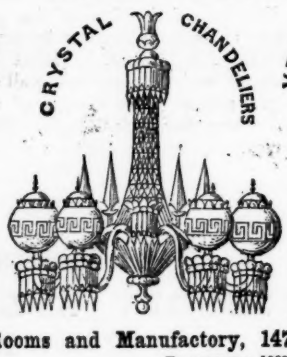

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Pattern-Books of Gas-Fittings, Crystal and Ormolu Chandeliers for 1870, are now complete.

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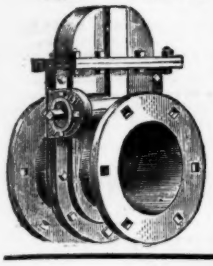
IMPROVED GAS-VALVES
WITH WROUGHT-IRON PINIONS,
From 2 inches to 18 inches, price 9s. 6d. to 12s. per inch diameter.



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These Valves are all proved on both sides to 30 lbs. on the square inch before leaving the works, and are always kept in stock.
VALVES MADE WITH OUTSIDE RACKS TO ORDER.
ALSO,
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COLCHESTER, ESSEX,
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Mr. Fraser having had more than Twenty years experience in the Construction, Alteration, and Management of GAS and WATER WORKS, will be happy to furnish information on all matters appertaining thereto.
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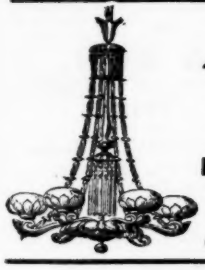

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TABLE GLASS OF ALL KINDS.
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RETORT SETTINGS, heated by tar without the production of smoke.
STEAM-ENGINES and EXHAUSTERS, separately or combined.
FOUR-WAY VALVES, one of which is equal to three ordinary Valves.
STATION GOVERNORS—the Gasholder cannot tilt and cause accident.
BREEZE AND TAR FUEL MACHINE.
A Pamphlet containing Eighteen Illustrations of the foregoing, with letterpress on the construction of Works, post free, 2s. 6d.
N.B.—The second edition of this Work, *now ready*, contains illustrations of the Machine for converting Breeze and Tar into Fuel for heating the Retorts.
"The Author is well qualified to speak authoritatively upon the important subjects to which his pamphlet refers."—*Artizan.*

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GASLIGHT PERFECTER.

Extract from Report by Dr. Letheby:—
"The results have been very remarkable, for they show an average increase of 63 per cent. on the illuminating power of the gas. I am of opinion, therefore, that the invention is of great practical value."
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Terms on application. N.B.—A specimen sent free on receipt of Twelve stamps.
. Further testimonials from Drs. Frankland and Crooks, showing the great practical value of this invention, will be shortly published.

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effecting a great saving of time, labour, and expense.
For particulars, price, &c., apply to Mr. E. PRICE, Gas-Works, HAMPTON WICK.

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SUPPLY GAS & WATER PIPES of EVERY SIZE.
Plain, Turned and Bored, and Coated.
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SLUICE COCKS, FIRE COCKS,
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GAS & HOT-WATER VALVES, &c.,
Of First-class Materials and Workmanship.
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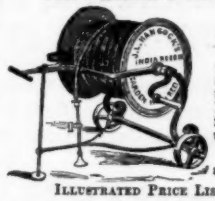
HOSE-PIPES,
FOR WATERING GARDENS, LAWNS, &c.



Made in 60 ft. lengths, and best make only.
Brass branches, with stop-cocks, jets, and spreaders, and union joints for connecting any size Hose.
HOSE REELS (galvanized iron or painted) for winding up the Hose.
Orders promptly executed, and
ILLUSTRATED PRICE LISTS ON APPLICATION.
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NAPHTHALINE
IN GASHOLDER INLET-PIPES.
With Livesey's Patent Man-Lid these Pipes can be examined and cleansed without loss of Gas, with the greatest facility and without any risk.
Cost of the Apparatus, to cover two 18-in. pipes, about £10.
Royalty: At the rate of 1s. per foot diameter of each Gasholder, and no further payment.
LIVESEY'S SYSTEM OF WATER-VALVES
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Will effectually prevent that contamination of the pure Gas which so frequently occurs where the ordinary Valves are used. They are much less costly, easily applied, and, being simple castings, cannot well get out of order, while by their use it is found that the Gas will bear a continuous test for Sulphuretted Hydrogen for an indefinite time.
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Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.
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AND DIAPHRAGM BIB & STOP VALVES,
MANUFACTURE EVERY DESCRIPTION OF
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WROUGHT-IRON
WELDED TUBE AND FITTINGS,
BLACK AND GALVANIZED;
BRASS, COPPER, LEAD, TIN, AND COMPOSITION TUBING,
STOCKS, TAPS, AND DIES,
And Every Description of Gas-Fitters Tools;
CAST-IRON GAS-MAIN COCKS,
WITH PATENT METAL PLUGS;
GAS SLIDE AND SLUICE VALVES;
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Large Pattern-Book and Price List of Gas-Fittings, price 7s. 6d., supplied on application.

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SHOW-ROOMS AND WHOLESALE WAREHOUSE FOR

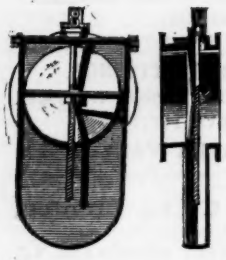
Wrought-Iron Tubes & Fittings for Gas, Water, & Steam; Chandeliers, Pendants, Lamps and Brackets, Plumbers Work, Water-Closets, Pumps, &c. Lead, Composition, Brass, and Copper Tubes.

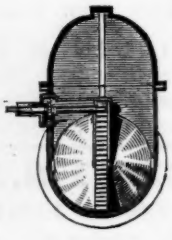
PATENTEES OF THE

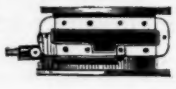
NEW FLEXIBLE VALVE

FOR

GAS & WATER WORKS.







This Valve has been designed to meet what has hitherto been felt a great want, in Gas-Works especially—namely, a *really tight* Valve which could be depended upon.

The new Valve is simple in construction, not liable to get out of order, cheap in price, and the principle can be adapted to every part of Gas Apparatus where a Valve is required.

Drawings, Price Lists, and further information sent on application.

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MANUFACTURERS OF

Gas Apparatus, Gasholders, Scrubbers, Condensers, & Purifiers; Iron Main-Pipes, Valves, & Fittings for Gas and Water; Wrought-Iron Retort-Lids; Wrought & Cast Iron Girders, Bridges, Piers, &c.

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GAS-METER MANUFACTURERS,

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SOLE MANUFACTURERS OF

THE PATENT IMPROVED TIN-PLATE DRY METER;

With special facilities for adjusting and repair, the principal parts of the mechanism being accessible by the removal of a single screw.

Gas-Meters on the Wet and Dry principles made in Cast-Iron and Tin-Plate Cases.

Station-Meters, Governors, Experimental & Test Meters, Gas Apparatus, &c.

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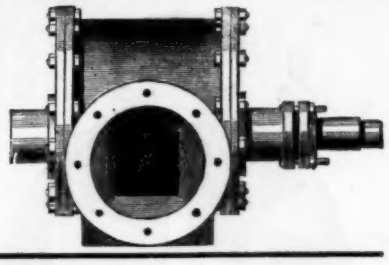
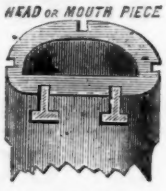
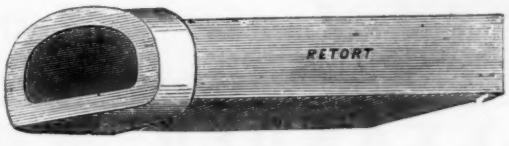


KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.





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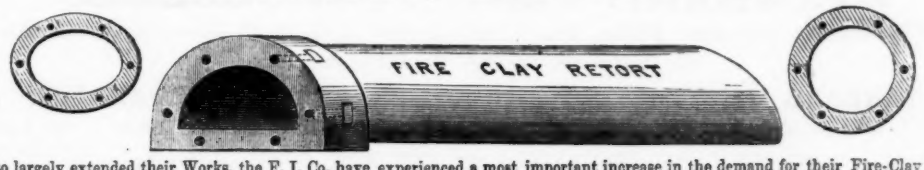

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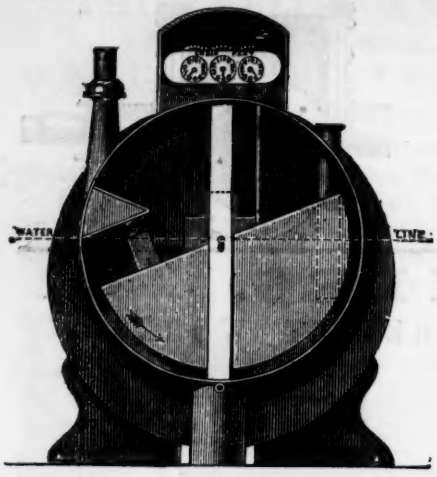

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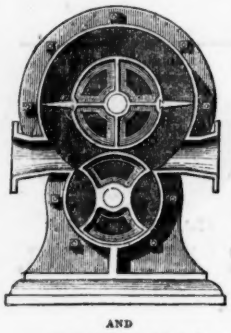

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